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МИНОБРНАУКИ РОССИИ

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«Юго-Западный государственный университет»
(ЮЗГУ)**

Кафедра иностранных языков



АНГЛИЙСКИЙ ЯЗЫК ДЛЯ БАКАЛАВРОВ: ЗАДАНИЯ ДЛЯ АУДИТОРНОЙ И ВНЕАУДИТОРНОЙ РАБОТЫ (ЧАСТЬ II)

Методические указания по английскому языку
для студентов 1 курса всех направлений подготовки

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Английский язык для бакалавров: задания для аудиторной и внеаудиторной работы (часть II): методические указания по английскому языку / Юго-Зап. гос. ун-т; сост.: В.Ю. Андреева; Курск, 2016. – 70 с.

Цель методических указаний сформировать у студентов первого курса базовый тезаурус и подготовить студентов к чтению специальной научно-технической литературы для извлечения информации, а также привить им навыки устной речи по специальной и неспециальной тематике. Методические указания основаны на оригинальных материалах, задания ориентированы на активное обучение английскому языку и формирование основных понятий в рамках технических и гуманитарных специальностей.

Методические указания соответствуют требованиям программы дисциплины «Иностранный язык» федерального компонента цикла общегуманитарных и социально-экономических дисциплин в ФГОС ВО.

Методические указания предназначены для студентов очного и заочного отделения первого курса всех направлений подготовки для практических занятий по дисциплине «Иностранный язык» (английский).

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Module 4

Sequence of tenses

(Согласование времен)

В английском языке существует правило согласования (последовательности) времен в сложноподчиненных предложениях с придаточными дополнительными. Оно заключается в том, что употребление времени глагола-сказуемого в придаточном дополнительном предложении зависит от времени глагола-сказуемого главного предложения. В русском языке согласования времен нет.

Если глагол-сказуемое главного предложения стоит в одной из форм *настоящего или будущего времени*, то глагол-сказуемое придаточного дополнительного предложения может стоять в любом времени, которое требуется по смыслу. В этом случае правило согласования времен не действует. Например:

They think (that)– <i>Они думают , что</i>	-he knows English <i>он знает английский хорошо.</i>	well.-
	-he knew English <i>он знал английский хорошо.</i>	well.-
	-he will know English	well.- <i>он будет знать английский хорошо.</i>

Если глагол-сказуемое главного предложения стоит в одной из форм *прошедшего времени*, то и глагол-сказуемое придаточного дополнительного предложения должен стоять в одном из *прошедших* времен или в будущем с точки зрения прошедшего (Future in the Past).

They thought (that)– <i>Они думали , что</i>	-he knew English <i>он знает английский хорошо.</i>	well.-
	-he had known English <i>он знал английский хорошо.</i>	well.-
	-he would know English	well.- <i>он будет знать английский хорошо.</i>

Правила согласования времен

Характер действия	Прямая речь	Косвенная речь
<p>1. Одновременность а) действие главного предложения происходит <i>одновременно</i> с действием придаточного б) действия, выраженные с помощью модальных глаголов</p>	<p>He said, "I work hard." He said, "I am working hard." He said, "I can work hard." He said, "I may work hard." He said, "I have to work hard." He said, "I must work hard." He said, "I should work hard." He said, "I ought to work hard."</p>	<p>He said (that) he worked hard. He said (that) he was working hard. He said (that) he could work hard. He said (that) he might work hard. He said (that) he had to work hard. He said (that) he must work hard. He said (that) he should work hard. He said (that) he ought to work hard.</p>
<p>2. Предшествование (два действия в прошлом, одно из которых произошло раньше другого)</p>	<p>He said, "I have worked hard." He said, 'i worked hard."</p>	<p>He said (that) he had worked hard. He said (that) he had worked hard.</p>
<p>3. Будущее действие (Future in the Past) (два действия, одно из которых в прошлом, а второе направлено на будущее)</p>	<p>He said, "I am going to work hard." He said, "I will work hard."</p>	<p>He said (that) he was going to work hard. 1 He said (that) he would/ work hard. /</p>

При этом указательные местоимения и наречия **времени и места** заменяются другими словами:

this – **that**

these – **those**

now – **then**

today – **that day**

tomorrow – **the next day, the following day**

the day after tomorrow – **two days later**

yesterday – **the day before**

the day before yesterday – **two days before**

ago – **before**

next year – **the next year, the following year**

tonight – **that night**

here – **there**

Правило согласования времен не соблюдается:

а) Если дополнительное придаточное предложение выражает общеизвестное положение, факт, суждение и т.п.

He knew that *Он знал,* *что*

metals conduct electricity. *металлы проводят электричество.*

Galileo proved that *the Галилей доказал,* *что*

Earth moves round the Sun. *Земля вращается вокруг Солнца.*

The speaker said that *the Оратор сказал,* *что*

peoples want peace. *люди хотят мира.*

б) С модальными глаголами **must, should, ought** и **need**, у которых нет форм прошедшего времени:

She said we must hurry. *Она сказала,* *что*
мы должны торопиться.

I knew that he should talk to you. *Я знал, что ему надо поговорить с тобой.*

I said he needn't talk to you. *Я сказала, что ему не надо говорить с тобой.*

Примечание: Модальные глаголы **can** и **may** имеют формы прошедшего времени **could** и **might**, которые и употребляются в дополнительных придаточных предложениях, если глагол главного стоит в прошедшем времени:

He said (that) he could *Он сказал, что не может прийти*
not promise to come to the party. *на вечеринку.*

ПРЕДТЕКСТОВЫЕ УПРАЖНЕНИЯ

Упражнение 1. Повторите времена групп Indefinite (Simple), Continuous, Perfect. Поставьте глаголы в скобках в нужном времени и форме.

At the time I first (meet) Mr. Alien in 1990, he (consider) the possibility of studying foreign languages again. He (forget) everything that he (learn) about Latin and French at school. The languages that he (want) (learn) at that time (be) Spanish and Portuguese. He (to be going) to study those languages in the Department of General Education at New York University. Therefore, he (enrol) that school in 1991.

After my friend (finish) studying at New York University he (decide) (go) to South America for a year. Because he (be, never) there before, he (enjoy) visiting the famous cities of Brazil and Argentina. He liked Sao Paulo so much that he (consider) staying there much longer. Before that time he (hope, always) to find a place with an ideal climate. Therefore, Sao Paulo (seem) to be a real paradise (рай). However, he (spend) all his money and (to be forced) to return.

Now my friend Mr. Alien (plan) (visit) France next year. He (leave) for Paris on March 15. Mr. Alien (visit) also Germany on the same trip. He realizes that he must (learn) French and German before he (go) to Europe. At present he (take) a course in French in preparation for the trip. He (think) that French (be) quite easy. Of course he (be, never) in France before, so he (have) little opportunity to hear French. He (work) very hard at his French every day. He (study) German at New York University next semester. I am sure that he (have) no language problem in the other countries when he (get) there. Many people in those countries (understand) English or French.

Упражнение 2. Переведите предложения, обращая внимание на правило согласования времен.

1. We knew that his family lived in Orel. 2. He said that the students of that group were studying in the library. 3. She thought that she might finish her work by two o'clock. 4. I didn't think he could come there in time. 5. She said that her name was Lena. 6. The students were told that they had three lectures every day. 7. The dean said that he was busy. 8. We found that he had studied mathematics at the University. 9. The newspapers reported that the Trade Union Congress had finished its work. 10. Students were informed that they would have industrial training in the third year. 11. The weather-man reported over the radio that it would be cold the following weekend.

Упражнение 3. Поставьте глаголы в скобках согласно правилу согласования времен.

A. 1. He says that he (want) to be an engineer. 2. He thinks that he (see) a new device already. 3. He knows that he (lose) his watch yesterday. 4. He says that he (help) with work next week. 5. He said that he (know) him. 6. He understood that the speaker (be) in London recently. 7. He said that he (think) about it later. 8. He asked what they (want) to do. 9. They asked when we (come) to see him. 10. He asked if I (can) stay with them. 11. The teacher wanted to know whether I (be) good at maths. 12. The professor wanted to know whether I (take) part in our conference the week before. 13. My friend wanted to know whether I (go) to the library next Saturday. 14. He asked which book she (read) at that moment.

B. 1. The engineer was told that he (may) test the device in the afternoon. 2. It was known that the head of our laboratory (be) a graduate of Moscow University. 3. They thought that she (graduate) from a technical institute. 4. Our professor informed us that he (give) the following lecture on quantum mechanics on Monday. 5. At the meeting it was said that our lecturer (work) at a new programme of laboratory work. 6. The teacher told us that the term «engineering» (have) many Russian equivalents. 7. The chief engineer believed that we (work) at that problem for a month the following summer.

Типы предложений в косвенной речи

1. **Общие вопросы** вводятся союзами **if, whether**, имеющими значение частицы **ли**. В придаточных предложениях соблюдается порядок слов утвердительного предложения.

He asked me: "Do you play the piano?" *Он спросил меня: «Вы играете на пианино?»*

He asked me **if** I played the piano. *Он спросил меня, играю ли я на пианино.*

2. **Специальные вопросы** вводятся тем же вопросительным словом, с которого начинается прямая речь. Соблюдается порядок слов утвердительного предложения.

He asked me: "**When** did you send the telegram?" *Он спросил меня: «Когда ты отослал телеграмму?»*

He asked me **when** I had sent the telegram. *Он спросил меня, когда я отослал телеграмму.*

3. Для передачи **побуждений** в косвенной речи употребляются простые предложения с инфинитивом с частицей **to**. Если прямая речь выражает приказание, то глагол **to say** заменяется глаголом **to tell велеть** или **to order приказывать**. Если прямая речь выражает **просьбу**, глагол **to say** заменяется глаголом **to ask просить**:

She said to him: "Come here at 9". *Она сказала ему: «Приходи сюда в 9 часов».*

She told him to come there at 9.

I said to her: "Please, give me that book". *Она велела ему прийти в 9 часов. Я сказал ей: «Дай мне, пожалуйста, эту книгу».*

I asked her to give me that book. *Я попросил ее дать мне эту книгу.*

Упражнение 4. Переделайте следующие предложения в косвенную речь, поставив глагол в главном предложении в прошедшем времени. Например:

Tom wants to spend the winter in Texas.

They said that Tom wanted to spend the winter in Texas.

He asked if Tom wanted to spend the winter in Texas.

1. Mary wants to take a course in German. 2. Ann does not work at the college. 3. The laboratories have new TV sets. 4. The teacher will give you further instructions. 5. Where are you coming from? 6. The lecture will begin in five minutes. 7. John has learned grammar for two years. 8. Could I speak to Mr. Smith, please? 9. Does Bob go to the library every day?

Упражнение 5. Измените следующие предложения по образцу.

The teacher says, "I have good news for you." — The teacher says (that) he/she has good news for us.

1. My sister said, "I don't want to do this work." 2. The young man explained, "I'm not enjoying my life in this small town." 3. Mother said, "I'm already late." 4. My friends said, "We can help you." 5. Linda complained, "I've never been to Paris." 6. The manager promised, "You'll get your money on time." 7. The secretary remarked, "I sent the fax two days ago."

Упражнение 6. Измените следующие вопросительные предложения по образцу.

He asks, "Are you happy?" — He asks if (whether) I am happy.

1. The tourists asked, "Will we visit the Bolshoi Theatre?" 2. A passer-by asked me, "Do you live in Moscow?" 3. The manager asked the secretary, "Have you already phoned our clients?" 4. The gardener asks, "Should I cut the grass?" 5. When I came home in the evening my parents said, "Did you have a good day?" 6. He asks, "Am I right or wrong?" 7. My boyfriend asks, "Were you born on the eighth of March?" 8. Everybody asks, "Can we trust those people?" 9. My Granny asked, "Will you visit me on Sunday?"

Упражнение 7. Измените следующие специальные вопросы согласно образцу:

He asks, "What's the matter?" — He asks what the matter is.

*She asks, "Where do you live?" — She asks **where I live.***

1. She asks the students, "Who is (the) Dean of your Faculty?" 2. She asks, "How much money is there on my account?" 3. I asked the old woman, "Who helps you with housework?" 4. The client asked, "Who is the director of the firm?" 5. My father asks me, "Why did you do that?" 6. The mother asked her daughter, "Where have you been?" 7. My friends ask me, "Where did you buy this disc?" 8. The teacher asked Peter, "Why did you break the window?" 9. The guide asks me, "What languages do you speak?" 10. My son asks me, "Who invented the telephone?"

Упражнение 8. Измените следующие повелительные предложения согласно образцу. Используйте данные в скобках слова.

*She says, "Come on time, please." (ask) — She asks us to come on time.
She says, "Don't be late!" (warn) — She warns us not to be late.*

1. The teacher says, "Read this book." (advise) 2. He says, "Help me with my homework." (beg) 3. The girl says, "You may kiss me." (allow) 4. The stewardess says to Jim, "Don't smoke, please." (tell) 5. They say, "Come and sit down." (invite) 6. The agent says, "Stay at this hotel." (recommend) 7. The doctor says, "Don't smoke and have a long rest." (advise) 8. The police officer says "Don't park your car here". (order).

Упражнение 9. Переведите на английский язык.

1. Мой друг сказал, что он много работает. 2. Ученый сообщил, что он написал статью о своей работе. 3. Он спросил, сделал ли я свою работу. 4. Она хотела знать, будет ли он летом в Москве. 5. Мы спросили преподавателя, сколько новых слов в четвертом уроке. 6. Мы не знали, будет ли у него практика летом. 7. Он сказал, что знает два иностранных языка. 8. Он знал, что ее брат живет в Самаре.

СЛОВООБРАЗОВАНИЕ

Упражнение 10. А. Переведите следующие производные слова согласно образцу:

<i>существительное или глагол + -ible/-able = прилагательное</i>	<i>access — доступ → accessible — доступный to rely — доверять → reliable —</i>
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	<i>надежный</i> practice – practicable, to use — usable, to consider — considerable, to avail — available;
<i>префикс dis-</i> (имеет отрицательное значение)	<i>to appear — появляться → to disappear — исчезать</i> to like — to dislike, illusion — disillusion, similar — dissimilar, comfort — discomfort, to connect — to disconnect, connection — disconnection, connected — disconnected, to organize — to disorganize, organized — disorganized, organization — disorganization

В.Образуйте слова согласно образцу:

<i>tele-</i> (на большом расстоянии)	<i>television, telegraph, telegraphy, telemetry</i> phone, text, scope, printer, communication;
<i>photo-</i> (имеющий отношение к свету или фотографии)	<i>photon, photograph, photography, photographic</i> copy, finish, meter, electric, sensitive.

СЛОВА И СЛОВСОЧЕТАНИЯ ДЛЯ ЗАПОМИНАНИЯ

appear *v* — появляться

artificial *a* — искусственный

compare *v* — сравнивать

contain *v* — содержать, вмещать

continuous *a* — непрерывный

convenient *a* — удобный

direct *a* — прямой, непосредственный

during *prp* — в течение, во время, в продолжение

equipment *n* — оборудование

influence *n* — влияние

means *n* — средство

nowadays *adv* — сейчас, в настоящее время

occur *v* — происходить, возникать

rapidly *adv* — быстро

research *n* — исследование

simultaneously *adv* — одновременно

state *v* — утверждать

essentially *adv* — по существу, главным образом

etc (etcetera) — и т. д.

exist *v* — существовать

few *a* — мало, немного

a few — несколько

a lot of — много;

to be able to — мочь, быть в состоянии

switch on *v* — включать

time *n* — время, times — раз

transmit *v* — передавать

watch *v* — наблюдать, смотреть

weigh *v* — весить, взвешивать

within *prp* — в пределах, в, через

Text 4A

Прочитайте текст и найдите абзацы, содержащие информацию о развитии различных видов телевизионных систем в хронологической последовательности. Переведите.

Television

The television set is evidently the most important and popular electronic product of all time. All homes in developed countries have one or more TV sets and in many countries there are considerably more TV sets than telephones.

But in 1939 at the World's Fair in New York a tiny nine-by-twelve inch box was the centre of attention for hundreds of people. They were the first to see a television set in action. Compared to today's TV shows of underwater and outer-space research, those first black-white pictures were not very good. The pictures were only transmitted from one side of the Fair territory to the other. But in 1939 they were of historical importance.

Within a few days the news of television spread throughout the world. A lot of people wanted to have a look¹ at the new invention. Everyone was interested in it. But only few people owned television sets in the next few years. When World War II broke out² electronic factories that began the TV production stopped making them and started making war materials instead. When the war was over, TV sets began coming off factory assembly lines. By 1958 there were millions of them.

In a surprisingly short time people watched fewer films and turned from newspapers and magazines to TV. In its short history television has had great influence on people's life and way of thinking. Rocket-launching, concerts and football and tennis matches can be seen direct

as they occur. The boundaries of time and space have disappeared.

At present TV communication is provided with the help of a system of artificial earth satellites so that people living in different parts of the country and all over the world and in different time zones are able to watch the central TV programs at the most convenient hours.

Nowadays many countries also have cable TV, a system using wires for the transmission of television programs (like telephone calls). Cable television first appeared in 1949 as a means of transmitting TV signals to rural and mountain areas far from big cities. Cable television's next big step forward was made by the mid — 1980s. Scientists announced that many technical problems had been solved and in the future it would be possible via satellite and cable TV to use more channels on a TV set at every home in the world.

Then we saw how a new technical invention, colour television, was rapidly replacing black-and-white television. Recently it was reported that the first pocket-size³ colour television set had been developed. It was stated that a liquid-crystal display⁴ was used similar to those on calculators and watches and that it weighed less than a pound.

A few years ago it became evident that the next major advance for TV would be digital television. In a digital system the usual continuous signal is replaced by a digital code containing detailed information on brightness, colour, etc. A digital TV set hangs on the wall like a picture. Essentially, it is a minicomputer with a visual display. Once a week⁵ you put the programs you like into the memory, and the TV set will automatically switch on the desired channel at the right time. You can watch several programs simultaneously on miniscreens and then produce one of them in full format. Also, the TV set can automatically video-record the programs when you are absent or occupied.

By the end of 1980s television has moved to a new and the most important stage in its development since the appearance of colour television. Technically it is called high-definition television (HDTV)⁶ or Hi-Vision. This is the much higher resolution television⁷ of the 21st century. This revolution was started by Japanese manufacturers when they developed a new video system with a picture resembling a wide-screen film more than traditional television. The new system increases the screen's width-to-height ratio⁸ (16:9). The result is a picture several times sharper than in the existing TV sets. Besides, recent developments in plasma display

panel technology⁹ make HDTV commercially practicable. The plasma display makes it possible to produce a large, bright, colour, flat TV screen so thin and light that it can also be hung on a wall like a framed picture. The engineering problem that has existed almost since the first days of television may be solved now.

Notes to the Text

1. to have a look — взглянуть, посмотреть
2. to break out — начаться, разразиться
3. pocket-size — карманный
4. liquid-crystal display — устройство изображения на жидких кристаллах
5. once a week — раз в неделю
6. high-definition television (HDTV) — телевидение высокой четкости
7. high resolution television — телевидение с большим разрешением
8. width-to-height ratio — отношение ширины к высоте
9. plasma display panel technology — производство плазменных панелей

УПРАЖНЕНИЯ

Упражнение 10. Просмотрите текст 4А и ответьте на вопросы.

1. When did the first TV set appear?
2. Were people interested in the new invention?
3. Why was the TV production stopped in 1940?
4. What is cable television?
5. What is digital television?
6. What is high-definition television?

Упражнение 11. Укажите, какие из следующих утверждений соответствуют содержанию текста 4А.

1. A lot of people owned television sets in the first years after its invention.
2. First television black-and-white pictures were excellent.
3. Only few people owned television sets in the next few years after their appearance.
4. Black-and-white television was rapidly replacing colour television.
5. First television black-and-white pictures were not very good.
6. Only a few years ago colour television was rapidly replacing black-and-white television.
7. When the war was over, TV sets stopped

coming off factory assembly lines. 8. After World War II TV sets began coming off factory assembly lines.

Упражнение 12. Найдите в тексте 4А предложения, в которых использовано правило согласования времен, и переведите их.

Упражнение 13. Прочитайте и найдите предложения, где использовано правило согласования времен.

1. Some years ago India began its Satellite Instructional Television Experiment. This experiment showed (that) satellite television programs had been a success with schoolchildren, their knowledge level had increased considerably. It was found that children could remember and speak about programs which they had seen several weeks back. 2. Many experts could not decide whether so much TV was harmful to the individual's health and mental activity or not. 3. Specialists did not know if it was possible to continue modernizing the electronic equipment of this kind — the costs were too high. 4. There appeared some reports that we had technical means to use much more channels on a TV set and we should be able to see many sports and news programs from all parts of the world soon. 5. At first it was not clear whether new telephone and teletype communication with ships via six satellites was economical and reliable or not. 6. It was announced that the cryogenic cable had been invented in Russia. 7. We read that for the first time electricity had been applied for industrial use in silver workshops in Paris. 8. We know different transmitters are used in a television system — one for the sound channel and the other for the picture channel. 9. We learnt from the lecture that electricity was still considered the main source for new technological developments.

УПРАЖНЕНИЯ ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ

Упражнение 14. Выберите правильный перевод следующих слов:

attention — внимательно, внимательный, внимание; surprisingly — удивительный, удивление, удивительно; recorder — записывающее устройство, запись, записывать; convenient — удобство, удобный, созывать; numerous — бесчисленный, количество, многочисленный.

Упражнение 15. Выпишите сначала синонимы, а затем антонимы.

tiny — small; to disappear — to appear; a lot of — many; different — various; next — following; short — long; to watch — to see; program — show; commonly — usually; less — more; possible — impossible; true — untrue; small — large; nowadays — at present, now; large — tremendous; advance — progress; to start — to begin; major — main; to report — to announce; to occur — to take place; convenient — suitable.

Упражнение 16. Найдите в словаре и запомните значения выделенных слов.

1. New **directions** of research in robotics were discussed at the last conference. 2. There is no **direct** connection between those processes. 3. This program is **directed** toward the scientific study of various physico-chemical processes. 4. Our scientists must **direct** their attention to the development of new technologies. 5. Further human progress is **directly** connected with the scientific and technological progress. 6. Our task is to develop technological processes without a **direct** participation of man. 7. The future of mankind depends on the **direction** in which scientific and technological progress will be developing. 8. There is a **direct** communication between spacecrafts and the Earth, and between spacecrafts as well.

Упражнение 17. Поставьте глагол, приведенный в скобках, в соответствующих времени и форме.

The Life of a Student

While I (walk) across the campus (университетский городок) the other day, I (meet) my old friend Bill, whom I (see, not) since May. Naturally, we (stop) (talk) to each other for a few minutes. I asked him how he (do) in his classes that semester. He told me that he (take) a course in English that semester. He said that he (complete) the elementary course two semesters before, and by the next semester he (be) ready (take) the most difficult English course offered at this school. He also said that he (be) interested in getting his degree as soon as possible and he (ask, already) his adviser for permission to take the final examination. «I am glad (hear) that you (make) such good progress», I (say) to Bill. Then I asked him if he (can) tell me the secret of his success. He answered that the secret of his success (be) simple and he

(study) at least two hours a day to improve his English.

After that I told Bill I (have) a little difficulty with my course in French at the moment. I said that I (study, not) very hard the last semester, but I (work) harder in the future.

CONVERSATION

Exercise 1. Answer the questions.

1. What invention was the center of attention at the World Fair in New York in 1939? (the first black-and-white television set) 2. What stopped the TV production? (World War II) 3. What influence has had television on people's life and way of thinking? (great influence; boundaries of time and space have disappeared) 4. What kinds of TV exist now? (satellite, cable, colour, digital and high-definition television) 5. What is the latest and the most important stage in the development of television since the appearance of colour television? (high-definition television) 6. What is the advantage of high-definition television? (the television of much higher resolution) 7. What technology makes HDTV commercially practicable now? (plasma display panel technology)

Exercise 2. Make a sentence out of the two parts.

1. The first black-and-white nine-by-twelve inch TV sets	a) has been replaced by colour television.
2. In a surprisingly short time	b) the development of TV became digital television in which the usual signal is replaced by a digital code.
3. At present	c) were of historical importance d) in 1939.
4. Satellite and cable TV makes it possible	e) television has had great influence on people's life and way of f) thinking.
5. Recently black-and-white TV	g) is the most important stage in h) the development of TV since the appearance of colour television.
6. The next major advance in	i) to watch TV programs in different parts of the country and

	throughout the world.
7. The invention of high-definition television with a picture resembling a wide screen film	j) there are different kinds of television systems: satellite, cable, colour, pocket-size, digital, high-definition television

Exercise 3. Speak about:

1. The history of television development.
2. Future development of television.

Use exercise 1 and 2 and the following words and word combinations for your topic: to be interested in; research; it is announced (reported) that; to solve problems; it became clear; compared to (with); to call; have an advantage; to find application in.

Exercise 5. Comment on the following statements:

1. Opponents usually say that the young people are too passive and too lazy (ЛЕНИВЫ) because they watch TV so much now.
2. We don't need the telephone, telegraph and television.

Exercise 6. Read and smile.

A Letter to a Sweetheart

A young man was writing a letter to his sweetheart (любимая) who lived just a few miles away in a nearby town. He began to tell her how much he loved her and how wonderful he thought she was. But the more he wrote, the more poetical he became. Finally, he said that in order to be with her he would suffer the greatest hardships (лишения), he would face the greatest dangers (опасность) that anyone could imagine. In fact, to spend only one minute with her, he would climb (подниматься) the highest mountain, he would swim the widest river, he would fight the fiercest (свирепый) animals. He signed his name, and then suddenly remembered that he had forgotten to mention something rather important. So, in a postscript below his name, he added: «By the way, I'll be over to see you on Wednesday night — if it doesn't rain».

A Frenchman in England

A Frenchman was once travelling in England. He could speak English quite well but not perfectly. His vocabulary was not large.

Once, for example, he was eating in a small country inn (гостиница) and he wanted to order some eggs. But he couldn't remember the word for eggs.

Suddenly, through the window, he saw a rooster (петух) walking in the yard. He immediately asked the waiter what the bird was called in English. The waiter told him that it was called a rooster. The Frenchman then asked what the rooster's wife was called. The waiter told him that she was called a hen. The Frenchman then asked what the hen's children were called. The waiter told him that they were called chickens. The Frenchman then asked what the chickens were called before they were born. The waiter told him that they were called eggs. «Fine!», said the Frenchman, «Please bring me two plus a cup of coffee and some toast.»

Text 4B

Прочитайте текст и найдите информацию о том, в каких странах ученые работали над созданием телеграфной связи, какие трудности встретились при этом. Перескажите.

Telegraph

Benjamin Franklin, an American who is famous for his interesting and useful inventions, published his ideas about electricity in 1752. Scientists in many countries became interested in this wonderful form of energy. They wanted to find the answer to a very important question: could the electricity be used to develop a fast, efficient system of long-distance communication? Experiments proved that electricity could travel instantly over a very long piece of wire. But a note that was written on a piece of paper couldn't be put into a wire. How could electricity be used to send a message? A Danish scientist discovered that electricity could move a needle from left to right and that the needle could be pointed at letters on a piece of paper. Then a German government worker made up a code system that could be used with an electric needle. In 1837 two English scientists sent a message by electric telegraph for a distance of more than 1.6 kilometers.

Samuel Morse, an American portrait painter, was experimenting with an electric telegraph too. At first he connected a pencil to an electric wire. When the electricity came through the wire the pencil made wavy lines. Then Morse invented a code that used dots and dashes for the letters of the alphabet. Finally, he discovered that telegraph messages did not have to

be written, they could be sent in sound.

On May 24, 1844, the first long-distance message was sent by telegraph for 64 kilometers.

Telegraph companies were formed in many cities. By 1861 telegraph wires stretched from the Atlantic to the Pacific. In Europe too, Samuel Morse's system became popular.

But telegraph wires couldn't be hung over an ocean. Messages to and from Europe had to be sent by ship — a journey of two or three weeks. A new method was needed.

The Atlantic Telegraph Company which was organized in 1856 wanted to try to lay a cable on the floor of the Atlantic Ocean. The 4,000-kilometer cable broke three times. Each time a new cable had to be made. Finally, on July 27, 1866, the first transatlantic message was sent from Newfoundland to Ireland.

Later cables were laid to Central and South America. After 1900 transpacific cables were laid to Asia and Australia. At last news and business information could be sent instantly to almost every country in the world.

Text 4C

Прочитайте текст и ответьте на следующие вопросы:

1. Какие биографические факты из жизни изобретателя телефона приведены в тексте?
2. Какие другие факты, кроме приведенных, вы знаете об изобретателе телефона?
3. Что нового вы узнали из текста? Соотнесите факты, относящиеся к истории развития телефонной связи, со следующими датами: 1877 г. и 1915 г.

Telephone

Alexander Graham Bell never planned to be an inventor, he wanted to be a musician or a teacher of deaf people (глухих). The subjects that he studied at school included music, art, literature, Latin and Greek. They did not include German which all scientists used in their books. Alexander's mother was a painter and a musician. His father was a well-known teacher of deaf people.

When Alexander was only sixteen, he became a teacher in boy's school

in Scotland. He liked teaching there, but he still wanted to become a teacher of deaf people as his father. He read all the books about sound that he could find and started to work on some of his own experiments.

At twenty five Alexander became interested in finding a way to send human voice through an electric wire. The parents of his pupils contributed money for the equipment. He found an assistant, Tom Watson, who worked in an electrical shop. For two years Tom and Alexander were working together to build a machine that people could use to talk to one another over long distances. After two years, the two young men were becoming discouraged (опустились руки). Then, one day, when they were working on a new transmitter Alexander spilled some acid (пролить кислоту) on himself. Tom Watson, who was alone in another room, heard a voice. The voice was coming through a wire to a receiver on the table! The voice was Alexander Bell's! It was saying: «Come here, Mr. Watson. I need you!»

The first telephone line was built in Germany in 1877. By 1915 a telephone line was opened in the United States — 5,440 kilometers from New York to San Francisco.

Now design bureaus all over the world are conducting experiments to develop video-phone or picture phone. A young man in Moscow wants to speak to his friend in Vladivostok. He lifts his telephone receiver, dials a number. After a very short time his friend answers. As he picks up his receiver, his picture appears on the screen. They can speak to each other face to face because they are using a new kind of telephone which may be called «a video-phone». In addition to the usual telephone, the equipment includes a small television screen (14 cm by 13 cm) and, combined with the screen, a television camera. The camera tube will allow the user to switch from a wide view of the room to the face of the person speaking. The focus can be changed to give clear pictures of objects 0.3, 0.9 and 6.0 meters away from the camera. There is also a mirror attachment, which allows the camera to scan documents which may be lying on the table. The camera adjusts itself automatically to different lighting conditions.

Text4D

Прочитайте и перескажите текст.

Talking via Space

Communication has come a long way from the time when an Indian beat a drum (барабан) in the forest to the time when a scientist receives messages from a satellite. In this space age communication has become a highly developed field. The system of communication in large countries is unthinkable today without space satellites. Besides large distances, there is a great time difference: the territories of some countries comprise up to 11 zones. Satellites help to minimize all the difficulties that may appear. They rapidly transmit TV and radio programs to different towns, cities, and distant areas.

Space systems and electronic technology have made it possible to set up an automatic system of communication designed for rapid transmission of all kinds of information.

People write letters and send telegrams. But at the same time people living in various cities like to exchange (обмениваться) news on the telephone. Statistics reports that the number of longdistance telephone calls is about 2, 000 million per year. A person in Moscow talking on the phone with Vladivostok must know that this conversation is carried on through a satellite.

Trains and cars can use mobile radio telephones to make calls. Businessmen can use fax machines which provide electronic transmission of documents and messages over telephone lines. Even photographs can be sent and received over telephone wires.

Practically all the population in large countries can watch TV via satellites. The orbital communication systems make it possible for people from different continents to see and hear one another.

The importance of space means of communication is increasing every year. The communication satellites of the international organization «INTERSAT» enable people to keep reliable telephone, telegraph, telex and fax communication in any weather with ships practically in every part of the World Ocean.

ДОПОЛНИТЕЛЬНЫЕ ЗАДАНИЯ

Упражнение 1. А. Прочитайте следующие выражения из текста 4А и постарайтесь догадаться о значении выделенных слов и словосочетаний.

1. TV sets began coming off factory **assembly lines**
2. on people's life and way of **thinking**
3. it weighed less than a **pound**
4. the desired **channel**
5. when you are **occupied**

В. Подберите к каждому выделенному слову или словосочетанию соответствующее ему по значению.

- a. unit of weight
- b. programme
- c. busy with smth.
- d. where parts of large machines are put together in mass production
- e. the way you think

Упражнение 2. Найдите в тексте слова *cell*, *network*, *area*, *set* и выберите правильное значение.

A cellular phone (cellphone) is a lightweight, portable radio transceiver, which can transmit and receive telephone calls anywhere in cellular network area. It is a mobile telephone, which communicates through base stations situated in areas called cells. Cell is a subdivision of communication area in a cellphone network. In the network, the same frequencies can be used for many different telephone calls at the same time. Each cell has its own small electronic base station and set of transmission frequencies. The sizes of the cell vary between 1 km to about 30 km across, depending on the output power of the cellphone transmitter.

1. cell
 - a) a small room for one person
 - b) apparatus for producing electricity by chemical action
 - c) a compartment in a larger structure (e.g., in a honeycomb)
2. network
 - a) a system of lines that cross

- b) a complex system of interconnected radio and TV devices
- c) a connected system
- 3. area
 - a) a zone, region, district
 - b) surface measure
 - c) range of activity
- 4. set
 - a) a number of smth. of the same kind
 - b) radio, TV, phone apparatus
 - c) direction

Упражнение 3. Подберите к глаголам и словосочетаниям в колонке А глаголы с тем же значением из колонки В.

А	В
1. link up to	a. contain
2. exchange news	b. connect
3. send a signal, message, fax	c. replace
4. show	d. make it difficult and impossible to read
5. take the place of	e. own
6. have, possess	f. communicate
7. make it illegible	g. transmit
8. have	h. indicate

Упражнение 4. Замените выделенное слово или словосочетание другим словом с тем же значением.

1. A Fax system can now **send** texts, graphics and documents to several places **at the same time** in less than a minute. The information may have photographic images as well as words. The latest Fax machines must be **linked up** to a special digital phone line. A few seconds' interference (помехи) on the phone line can make several lines of a document or text **illegible**.

2. Digital systems of information transmission **have taken the place** of analog systems in the last 25 years.

3. Most phones now **have** memories to store frequently used numbers. Some telephone manufacturers make phones with LCDs (liquid-crystal displays) which **show** the duration of calls.

4. Before World War II few people **had** television sets.
5. A lot of people **have** cellphones, answerphones and mobile phones now.
6. It is possible to **exchange news** with people in most parts of the world by telephone.

Упражнение 5. Заполните пропуски глаголами *connect*, *transmit*, *communicate* и их производными.

1. A small radio receiver called a radiopager makes it possible for people to ... with each other wherever they are.
2. Data ... services, known as teletext... text and graphics over a long distance as part of the television video signal.
3. In telecommunication the information can be directed between ... and receivers by cables of various kinds.
4. The lines which ... telephones within a building are the simplest type of... line.
5. Mobile phone systems normally do not... directly with other mobile phones. They send messages to the control base station.
6. How long will the ... of the new telephone take?
7. You can now ... your computer to computers all over the world by means of the Internet.

Упражнение 6. Speak about:
Your favourite TV programmes at the moment.

родительном падеже или причастным оборотом.

б) существительным с предлогом

the building **of the institute**

здание **института**

the train **from Moscow**

поезд **из Москвы**

the text book **for beginners**

учебник для **начинающих**

the method **in use**

используемый метод

7) существительным-приложением, поясняющим стоящее перед ним существительное

The Cherepanovs, **the inventors of the first Russian locomotive**, were workers. We must translate this article by the end of the week, **which is not an easy task**.

Черепановы, изобретатели первого русского паровоза, были рабочими. Мы должны перевести эту статью к концу недели, что является нелегкой задачей.

8) причастием (Participle I или Participle II), которое может стоять как перед определяемым существительным, так и после него

a **fast running** taxi

быстромчащееся такси

students **going to the University**

студенты, **которые идут (идущие) в Университет**

illustrated journal

иллюстрированный журнал

the book **translated in 1980**

книга, **переведенная в 1980 году**

9) герундием

a way of **reading**

манера **чтения** возможность

the possibility of **using**

использования

10) инфинитивом

an article **to translate**

статья для **перевода**

11) определительным придаточным предложением, которое присоединяется к главному предложению при помощи **союзных слов who который; whom которого; whose чей, которого; when когда; where куда, где; why почему** или бессоюзным способом

I have read the article **which you recommended**.

I have read the article **you recommended**.

The town **in which I live** is not far from Moscow.

The town **which I live in** is not far from Moscow.

The town **I live in** is not far from Moscow.

ПРЕДТЕКСТОВЫЕ УПРАЖНЕНИЯ

Упражнение 1. Переведите словосочетания, обращая внимание на разные способы выражения определения.

a new invention, to be of great importance, books available in this library, at this time, our professor's lectures, the building of their institute, an institute's library, a television programme, our central TV programme, the first television set, the first pocket-size colour television set, today's shows, a tiny nine-by-twelve inch box, the 1939 World Fair, a reading room, people living in different time zones of the country, modern TV sets appearing now, a written text, a factory built in Siberia, an article to translate, the first to translate those texts.

Упражнение 2. Укажите предложения, где выделенное слово является определением.

1. Complex systems of **radio** transmission networks have been set up throughout the world. 2. Scientists all over the world were quick to realize the importance of **radio** and contributed much to its further development. 3. The Russian scientist A.S.Popov worked much at the problem of **radio** communication. 4. It is necessary to **radio** the latest news to distant parts of the country. 5. The system of **communication** in any country is unthinkable today without satellites. 6. Electronic technology has made it possible to set up automatic **communication** systems. 7. A new international orbital system provides telephone, telegraph and telex **communication** with ships practically in every part of the World Ocean. 8. It is known that a **photon** is a particle of light. 9. Some specialists expect that a **photon** can greatly increase the operation of a computer. 10. **Photon** computers are quite possible in the not so far future.

Упражнение 3. Переведите на русский атрибутивные фразы, в которых определения выражены существительными:

morning news

control system

computer revolution

water drop temperature

laser printer

space research program

ocean floor

hydraulic fluid temperature

Упражнение 4. Найдите определения в предложениях и переведите их.

A. 1. There are twenty-five students in our group, five students got excellent marks for all their exams. 2. Students studying at our institute must know mathematics well. 3. The device made at our laboratory will be used in industry. 4. It is a short and easy text, our students don't need a dictionary to translate it. 5. Scientists working at new computers have a lot of different problems to solve. 6. A citizen of our country was the first to circle the globe. 7. The first television black-and-white pictures produced a sensation in 1939. 8. A tiny nine-by-twelve inch box was displayed at the 1939 World Fair. 9. Now we can see many different radio and TV sets in every house. 10. Computers of different types and sizes have appeared in every country of the world.

B. 1. Materials necessary at present to produce supercomputers are difficult to make. 2. A system capable of transmitting long distance messages was developed at the end of the last century. 3. People present at the World Fair in New York were interested in the new invention. 4. Some general engineering subjects difficult for the first-year students are necessary for studying specialized subjects.

Упражнение 5. Назовите подлежащее придаточного определительного предложения, переведите и укажите, где можно опустить союзное слово.

1. Morse invented a code that used dots and dashes for letters of the alphabet. 2. Al. Bell found an assistant who was a specialist in electrical engineering. 3. They wanted to build a machine which people could use to talk over long distances. 4. A television screen and camera that will be used with a usual telephone are very small. 5. People who come to the Aircraft Fair in Paris see new designs of aircraft from different countries. 6. Bell

did not know German which most writers of scientific and technical papers used at the time. 7. The decimal system that was developed by French scientists was introduced in Russia by D.I. Mendeleev.

Упражнение 6. Измените предложения, где это возможно, согласно образцам и переведите.

А. Например: *The experiments which Popov made were discussed at the _____ University meeting.*
The experiments Popov made were discussed at the University meeting.

1. Newton's great work which was published in 1687 is called «Principia». 2. The Russian Chemical Society which is named after Mendeleev was organised more than a century ago. 3. The subjects that the students study in the first and second years are very important for their future speciality. 4. The invention which Popov made did not interest the government.

В. Например: *The laboratory in which the students will work is in a new _____ building.*
The _____ laboratory the students will work in is in a new building.

1. The film about which we were told had been made several years before. 2. The magazine in which a very interesting article is published is available in our library. 3. The material of which this instrument is made is a new one. 4. This is a subject about which we don't know much. 5. The cosmonauts about whom we heard so much came to our town. 6. Have you seen the main components which the new device consists of?

Упражнение 7. Найдите бессоюзные определительные придаточные предложения, переведите их.

1. The building our students live in is not far from the institute. 2. Bell was making his experiment in a room next to the room Watson worked in. 3. For a long time Bell couldn't get the results he was looking for. 4. The discovery of Newton's mistake we shall read about was made by a young physicist. 5. When Roentgen made his discovery the room he was experimenting in was dark. 6. The plant this material is produced at is in the Urals. 7. The problem this article deals with is

connected with the subject we study. 8. It is difficult to imagine the world we live in without radio, television and telephone.

Упражнение 8. Определите, являются ли выделенные слова существительным или глаголом. Назовите подтверждающие это признаки.

1. this **means** that; this **means**; **it means**; new **means**; this **means** is.
2. this **increase** is; this **increases**; **it increases**; nothing **increases** its **increase**.
3. these **results**; this **results** in; both **results**; this **result**; both **result** in; **it results** from.

СЛОВООБРАЗОВАНИЕ

Упражнение 9. А. Переведите следующие производные слова:

<i>глагол или существительное + -ive = прилагательное</i>	<i>to act — действовать → active — деятельный, intensity- интенсивность → intensive-интенсивный</i> <i>to conserve — conservative, progress — progressive, effect — effective, mass — massive, to react — reactive;</i>
<i>суффикс существительного -ure</i>	<i>nature — природа; culture — культура</i> <i>structure, manufacture, future, measure, feature, agriculture;</i>
<i>префикс super- (сверх, супер)</i>	<i>supernatural — сверхестественный; superpower — сверхдержава</i> <i>supergenius, supercomputer, superman, supermarket, supersonic, superhot, superconductor.</i>

В. Образуйте и переведите производные слова согласно образцу:

<i>префиксы micro-, mini- (микро-, мини-)</i>	<i>microscope — микроскоп, microscopic — микроскопический</i> <i>computer, chip, electronics, fiche, film, phone, processor, wave, organism;</i> <i>minimum — минимум, minimal —</i>
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	<i>минимальный,</i>	<i>minimize</i>	—
	<i>минимизировать,</i>	<i>сводить</i>	к
	<i>минимуму</i>		
	computer, screen, tour, bus, skirt, -sized.		

СЛОВА И СЛОВСОЧЕТАНИЯ ДЛЯ ЗАПОМИНАНИЯ

according to *adv* — согласно, соответственно

available *a* — доступный, имеющийся в распоряжении

beam *n* — луч

built-in *p.p.* — встроенный

by means of *prp* — посредством, при помощи

calculation *n* — вычисление

capable *a* — способный

circuit *n* — схема, цепь

close *a* — близкий, тесный

complete *v* — завершать

control — управлять, контролировать

depend on *v* — зависеть от

fast *a* — быстрый

generation *n* — поколение

go on *v* — продолжать (ся)

machine-tool *n* — станок

matter *n* — дело, вопрос

ordinary — обыкновенный

perform *v* — выполнять, делать, исполнять

quality *n* — качество

reliable *a* — надежный

require *v* — требовать(ся)

speed *n* — скорость

surround *v* — окружать

task *n* — задача

up to *prp* — вплоть до

usage *n* — использование

whereas *conj* — тогда как, в то время как

Текст 5А

Прочитайте текст и прокомментируйте его заголовок. Прав ли автор, дав такой заголовок? Найдите в тексте соответствующие факты. Переведите.

Is there an End to the Computer Race?

Today the word «electronics» is in general usage. Millions of people have electron watches. There are a lot of various radio and TV sets, CD and MP3 players, mobiles telephones, computers and laptops in our houses. In factories and plants we are surrounded with electronically controlled machines and instruments, we are carried by airplanes, ships, trains and cars with built-in electronic devices, and satellites circle the

globe. In other words, we are living in an electronic world.

And the center of this world is a tiny silicon plate¹ of a few square millimetres, an integrated circuit², or a chip³, as it is more commonly known. The integrated circuit is undoubtedly one of the most sophisticated⁴ inventions of man, science and technology. It is in the heart of every electronic device and the more cassette recorders, TV sets and computers we need, the more integrated circuits are required.

When we speak about a further development of computers we mean not only quantity, but also high technology⁵ and high speed. As the operation of an integrated circuit depends on microscopic «components», the purity of all materials and the cleanness at the plant they are produced at must be of the highest quality. A continuous search is going on in laboratories throughout the world for more perfect, reliable and high speed electronic circuits.

In the past it took⁶ scientists and researchers a whole lifetime to make a few thousand calculations, whereas for a modern computer this task is a matter of a few seconds. At present computers capable of performing billions of operations a second are required. Supercomputers are different from ordinary computers. The ordinary computer does the computations operation by operation, while the supercomputer operates like a brain: all operations are being done simultaneously.

In the next few years engineers will complete the work on computers of above 2 billion operations a second. It will take a few more years to produce a 10-billion operations computer. The fifth-generation computers performing 100 billion operations a second will become available in the near future. Is there an end to this race?

According to some researchers, we are close to what can be regarded as a true physical limit. But other specialists think that photons will make the operation a thousand times faster. This means that in the future it will be possible to expect the appearance of photon computers and that computations will be done by means of light. Light has several advantages over electronics: light beams are faster, travel in parallel lines and can pass through one another without interference⁷. Already, the optical equivalent of a transistor has been produced, and intensive research on optical-electronic computers is being carried out in a number of countries around the world. In a few decades a new age of light may replace the still youthful electronic age. The race is going on.

Notes to the Text

1. silicon plate — кремниевая пластина
2. integrated circuit — интегральная схема
3. chip — кристалл
4. sophisticated — сложный
5. high technology — передовая технология
6. it takes ... (one year) — требуется
7. interference — взаимное влияние, помехи

УПРАЖНЕНИЯ

Упражнение 10. Просмотрите текст 5А и ответьте на вопросы.

1. What is this text about? 2. What new things appeared in people's everyday life after World War II? 3. What is at the center of all these things? 4. What applications of computers do you know? 5. Where else (еще) may computers be used? 6. How does an ordinary computer (a supercomputer) operate? 7. What is the speed of a new supercomputer? 8. What is the task of engineers in the field of computer development? 9. What types of computers do you know? 10. What are the prospects in the development of computers?

Упражнение 11. Укажите, какие из следующих утверждений соответствуют содержанию текста 5А.

1. Nowadays an integrated circuit is the main component of everyday device. 2. Supercomputers are in general usage now. 3. The operation of integrated circuits depends on their microscopic component quality. 4. Some researchers think that we are close to a physical limit in increasing computer operation speed. 5. Supercomputers are similar to ordinary computers. 6. By the beginning of the 21st century the electronic age may replace the light age. 7. It is possible to expect the appearance of optical-electronic computers in the future.

Упражнение 12. Найдите в тексте 5А цепочки существительных-определений, состоящих не менее чем из трех компонентов, выделите основное слово и переведите.

УПРАЖНЕНИЯ ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ

Упражнение 13. Образуйте слова с префиксом *super-* и переведите их. man, power, genius, hot, hard, natural, conductor.

Упражнение 14. Найдите слова с отрицательным значением.

true, unusual, important, disappearance, incapable, information, undiscovered, capable, untrue, changing, usual, undetected, unimportant, appearance, detected, discovered, intention, possible, include, impossible, disadvantages, imagine, unchanging.

Упражнение 15. Найдите в колонке В эквиваленты словосочетаниям из колонки А.

А	В
1. to make faster	a. many
2. able	b. supercomputer
3. a lot of	c to improve
4. at present	d. capable
5. to make better	e. nowadays
6. to be different from	f. to increase
7. a computer which does all operations simultaneously	g. to differ
8. it takes	h. it requires

Упражнение 16. Найдите антонимы.

simple, untrue, begin, sophisticated, reliable, efficient, close to, true, complete, low, disadvantage, far from, high, unreliable, inefficient, advantage.

Упражнение 17. Переведите выделенные слова и запомните их.

1. In the past «Engineer» **meant** a designer of engines. 2. The word «a means» **means** «средство». 3. **The meaning of** «telemetry» is «measuring at a distance» and is a combination of Greek and Latin words. 4. **By means** of satellites we can communicate with any country of the world. 5. There were no **means of** direct communication before the telephone was invented. 6. By communication we **mean** various

ways to send information. 7. Scientists reported that we had technical **means** to use more channels on a TV set. 8. The importance of space **means** of communication is increasing every year. 9. By what **means** is speech transmitted over a distance? 10. **By means of** telephone people communicate with each other at great distances. 11. The **mean** distance between these two objects is not known yet.

Упражнение 18. Заполните пропуски словами *few* или *a few*.

1. ... people know that the first programmer in the world was Lord Bayron's daughter. 2. In the past astronomers spent all their lives to make ... hundred thousand calculations. 3. A calculator makes these calculations in ... seconds. 4. In the next ... years a new generation computer will be developed. 5. ... people read that the first electric light illuminated the laboratory of Vasily Petrov, a St. Petersburg physicist, in 1862.

CONVERSATION

Exercise 1. Answer the questions.

1. What influences the operation of an integrated circuit? (the quality of microscopic components it consists of) 2. What is the function of a computer? (making a great number of calculations at a very high speed) 3. What will be the speed of the fifth-generation computers? (100 billion operations a second) 4. What can increase the operation speed many times compared to the present computers? (a photon) 5. What physical phenomenon can be used to improve a computer's speed? (light) 6. What are the advantages of light for computation purposes over electronics? (the capability to move faster, in parallel lines and pass one another)

Exercise 2. Make a sentence out of the two parts.

1. Nowadays electronic devices	1. airplanes, ships, trains and cars having built-in electronic circuits and instruments.
2. We are surrounded	2. is being used more widely at home and in office.

3. There are	3. without electronically controlled machine-tools.
4. A personal computer	4. with electronics everywhere in everyday life and at plants and factories.
5. People are carried by	5. scientific research without computers.
6. The modern production is unthinkable	6. are in general usage.
7. It is impossible to imagine	7. electronic watches we wear, telephone, radio, and TV sets we speak, listen to and watch.

Exercise 3. Speak about:

1. The application of electronics in everyday life,
2. New developments in computers.

Use exercise 1, 2 and the following words and word combinations for your topic: to be in general usage, research is going on, throughout the world, further development, high speed electronic circuits of the highest quality, according to some researchers, a photon computer, by means of light, advantage over, in a few decades.

Exercise 4. Comment on the following statement.

Electronic games are very popular today. There are already up to 10,000 different computer games in the world.

Text 5B

Прочитайте текст и найдите информацию об использовании компьютеров в повседневной жизни и работе людей. Выпишите и переведите определительные придаточные предложения.

Computers Concern You

When Ch. Babbage, a professor of mathematics at Cambridge University, invented the first calculating machine in 1812, he could hardly have imagined the situations we find ourselves in today. Almost everything in modern world is done with the help of computers — the

complicated descendants (потомки) of his simple machine. Computers are being used more and more extensively in the world today, for the simple reason that they are far more efficient than human beings. They have much better memories and can store (запоминать) great amount of information and they can do calculations in a fraction of the time required by a human mathematician. No man alive can do 500,000 sums in one second, but a modern computer can.

In fact, computers can do many things we do, but faster and better. They can control machines at factories, work out tomorrow's weather and even play chess, write poetry or compose music. Let's look now at some of the ways in which computers concern people in their daily lives and work.

Many people associate computers with the world of science and mathematics, but they are also a great help to scholars in other subjects: in history, literature and so on. It is now possible for a scholar to find a book or an article he needs very quickly, which nowadays when a million or more new books are published each year is quite an advantage. You tell the computer which subject you are interested in and it produces any microfiche (микрофише, диамикрокарта) you need in seconds.

There are also systems which are being developed to translate articles from foreign magazines by computer and to make up many lists of information which are needed in a modern library. So, computer can help us to deal with the knowledge explosion in many ways. One can imagine a time when libraries will be run by computers, without human beings at all.

Or, let's take another example. When a man drives a car for long distances he has two problems: to keep the car at a constant speed and watch that he does not run into the car in front of him. Engineers are now experimenting with a system which has a computer control of these two problems. The car's computer keeps the speed constant. At the same time the distance between the car and any other car in front of it is measured by a beam of light transmitted forwards. The beam meets the rear reflectors of the car in front and it is reflected back, which enables to measure the distance. This information is fed to the computer which adjusts (регулировать) its speed control accordingly.

Техт 5С

Прочитайте текст и озаглавьте его. Кратко изложите основное содержание текста по-английски.

Sir Isaac Newton was a supergenius of science who among other things invented calculus (исчисление), stated the laws of gravity and optics. But it turned out (оказываться) Newton also made mistakes. The University of Chicago announced recently that R. Garusto, 23, a physicist, had discovered in one of Newton's calculations an error that had been undetected for three centuries.

The young scientist discovered it while he was studying Newton's masterpiece (шедевр) of physics «Principia» (1687). Newton had derived (выводить) a figure for the Earth's mass based on his new theory that a single force — gravity — governed (управлять) falling bodies on the Earth and the motion of planets around the Sun. The calculation depended on the angle (угол) between two lines from the Earth to the Sun, but because that angle was not exactly known at the time, Newton used slightly different figures in «Principia». It was that mistake that the young scientist found, a discovery that was soon confirmed (подтвердить) by other physicists. The mistake has no influence on Newton's theory, but its discovery was enough to get him a prize from the University of Chicago.

ДОПОЛНИТЕЛЬНЫЕ ЗАДАНИЯ

Упражнение 1. А. Прочитайте следующие словосочетания из текста 5А и постарайтесь догадаться о значении выделенных слов в данном контексте.

1. the **word** «electronics» is in general usage
3. more **perfect** electronic circuits
4. **billions** of operations
5. what can be **regarded** as
6. the still youthful electronic **age**

В. Подберите к каждому выделенному в А слову или словосочетанию соответствующее ему по значению.

- a. excellent, exact, accurate

- b. combination of written symbols forming vocabulary of a language
- c consider
- d. great or long period of time with special characteristics
- e. one thousand million (GB), 10^9 (US)

Упражнение 2. Прочитайте текст и найдите эквиваленты следующим словам и словосочетаниям:

1. number
2. tiny
3. not likely to change
4. signal to ring a bell at a fixed (certain) time
5. divide into two equal parts
6. watch that is used to time sport events, such as a race, to a fraction (small part) of a second
7. a place between the hand and the arm
8. not fast, slowly
9. smth. that helps smb. to remember, not to forget
10. start or begin a process
11. Hertz (Hz)
12. speed

Digital Watch

In a digital watch the mechanical parts of the traditional mechanical wristwatch have been replaced by a vibrating quartz crystal to keep time. The vibrating quartz crystal is controlled by minute electronic circuits. One of the advantages of quartz is that it is very stable. The artificial quartz crystals used in digital watches are designed to vibrate up to 32,768 cycles per second when the current from a battery is passed through them.

These vibrations produce electric pulses. As the pulses travel through the electronic circuits of the microchip, their rate is gradually halved. The result is a pulse rate of one per second.

Each one-second pulse triggers the microchip to send signals to the liquid crystal display to advance the numerals by one second. The pulses are also used to control different functions. Such a digital watch can show the day and date; it can have an alarm and a reminder and can act as a stopwatch with an accuracy of 1/100th second.

Упражнение 3. Прочитайте следующие определения компьютерных терминов, дайте русские эквиваленты выделенных слов и словосочетаний. Переведите предложения.

1. **Hardware** means the different types of equipment a computer consists of.

2. A computer's hardware comprises a **central processing unit (CPU)** which is the heart and brain of the computer.

3. **Input and output devices** capable of putting information into a computer and getting it out of it are types of peripheral equipment. **Peripherals** are the units connected to the CPU: input devices, output devices and storage devices.

4. The simplest and most common type of input device is a keyboard, containing a typewriter **keyboard**.

5. A **laser printer** is a kind of output device to print information.

6. **Software** means the programs needed to operate computer equipment.

7. These programs are on **disks**, the **hard disks** inside the computer, or **floppy disks**, or on **CD-ROMs**, that is, Compact Disk Read Only Memory, which you can put on or store a large amount of information. A **disk** is a storage device made of flat circular plates with magnetizable surfaces. A **hard disk** is a disk made from a solid magnetic material and used as a storage device. A **floppy disk** (also called diskette) is a disk made of flexible plastic material upon which data are stored on magnetic tracks. **Tracks** are areas marked on the surface of a disk. A **disk drive** is the electronic mechanism that actually reads what is on a disk. In hard disks, the disk and the drive are built into a single unit.

8. A **word processor** is a computer used to write documents, letters and reports, or the software that is used for this purpose.

9. **Databases** are programs, which allow you to store, look at or change a large quantity of information quickly and easily.

10. **Graphics** are pictures and symbols a computer program can produce.

11. An extra copy on a floppy disk is called a **back-up copy**, a copy of data or software, usually kept in case the original disk is damaged or destroyed.

12. A **bug** possible in a computer operation, also a virus is a software problem or error in a program. **Debugging** means correcting

program errors or bugs.

13. People send **e-mail** (electronic mail) messages with the help of the **Internet**, a system that lets computers connect by telephone lines.

14. A **laptop** is a portable computer weighing about 2—4 kg.

15. With a device called the **mouse** you can do a number of things by **clicking** on different **icons**.

16. A **mouse** is a small input device, on the top of which there are one or more buttons for communicating with the computer.

17. **Clicking** is a basic mouse action to place a cursor to close a window, etc.

18. An **icon** is a small picture representing an object, process or function.

Упражнение 4. Заполните пропуски, образуя общеизвестные компьютерные термины. Запомните их.

1. data ...	12. mini ...
2. integrated ... or chip	13. ... copy
3. soft ...	14. fifth ... computer
4. ... ROM	15. ... processor
5. hard ...	16. e-...
6. floppy ...	17. ... age
7. ... disk	18. photon ...
8. input, output ...	19. ... writer
9. super ...	20. key ...
10. physical ...	21. laser ...
11. ... network	22. mini ...

Упражнение 5. Заполните таблицу на словообразование.

Verb, Noun	Adjective
create	...
...	possessive
act	...
compete	competitive

attract	...
...	comparative
expense	...
sense	...
mass	...

Упражнение 6. Назовите прилагательные с суффиксом *-ible/-able*, означающие:

- 1) that can be done, can exist, happen;
- 2) that cannot be done, cannot exist, happen;
- 3) that can be used;
- 4) that may be obtained, can be used;
- 5) that may be relied on;
- 6) that cannot be relied on;
- 7) which may be questioned;
- 8) which may not be questioned;
- 9) absolutely essential.

Упражнение 7. Заполните таблицу на словообразование.

Noun	Adjective	Adverb
...	...	questionably
availability
capability
...	usable	...
...	...	possibly
reliability
quality
quantity
...	...	intensively
indispensability

Упражнение 8. Speak about:

1. A lot of people are becoming computer **literate** (have experience of working with computers and know how to use them). Are you computer literate? Do you find most computers «**user-friendly**» (easy to use)?

2. The Internet and its influence on our daily life. Can it help people from different countries to learn English?

Module 6 Modal verbs

(Модальные глаголы и их эквиваленты)

Модальные глаголы выражают не само действие или состояние, а отношение к ним со стороны говорящего. С помощью модальных глаголов можно показать, что действие возможно или невозможно, обязательно или не нужно, вероятно или неправдоподобно, желательно и т.д. Модальными являются глаголы **can, may, must, ought, should, would, need**.

Особенностью модальных глаголов является то, что они:

1) не имеют полного самостоятельного значения и употребляются в сочетании с инфинитивом смыслового глагола (без частицы *to*);

2) не имеют инфинитива, причастия, герундия;

3) не имеют окончания *-s* в 3-м лице единственного числа настоящего времени;

4) не имеют формы прошедшего времени, кроме **can** и **may (could, might)**, и будущего времени;

5) образуют вопросительную и отрицательную формы без вспомогательного глагола **to do**:

May I take your dictionary? He cannot drive a car.

Рассмотрим примеры употребления модальных глаголов.

Can

Глагол **can** имеет значение *мочь, обладать физической или умственной способностью*: **can** (настоящее время) *могу, может, можем* и т.д.; **could** (прошедшее время) *мог, могла, могло* и т.д. Например:

Even a child **can** lift it.

Даже ребенок может поднять это (это легко сделать).

Can you speak English?

Вы можете говорить по-английски?

Сочетание **to be able** *быть в состоянии* с последующим инфинитивом с частицей **to** является эквивалентом глагола **can** и восполняет его недостающие формы:

We shall **be able to do it**
only tomorrow.

Мы сможем сделать это только
завтра.

May

Глагол **may** имеет значения разрешения и возможности: **may** (настоящее время) *могу, может, можем* и т.д.; **might** (прошедшее время) *мог, могли* и т.д. Например:

May I come in?

Можно мне войти?

He **may** be at home.

Он, может быть, дома

Сочетания **to be allowed** и **to be permitted** с последующим инфинитивом с частицей **to** являются эквивалентом глагола **may** и восполняют его недостающие формы в значении *мочь, иметь разрешение*:

He **was allowed to** come in.

Ему разрешили войти.

Must

Глагол **must** выражает необходимость, моральную обязанность и соответствует в русском языке словам *должен, нужно, надо*. Глагол **must** имеет только одну форму настоящего времени:

You **must** do it yourself.

Вы должны это сделать.

Наряду с глаголом **must** и взамен его недостающих форм употребляются его эквиваленты **to have** (должен в силу обстоятельств) и **to be** (должен в силу запланированности, намеренности действия), а следующий за ними инфинитив имеет частицу **to**:

It was raining heavily and we
had to stay at home.

Шел сильный дождь, и мы
должны были остаться дома.

He **is to take** his exam in
June.

Он должен сдавать этот экза-
мен в июне.

Ought

Глагол **ought** выражает моральный долг, желательность действия, относящиеся к настоящему и будущему времени. На русский язык **ought** переводится словами *следовало бы, следует, должен*. После **ought** инфинитив всегда употребляется с частицей **to**:

You **ought to** see a doctor. Тебе следовало бы обратиться к врачу.

Should

Глагол **should** в качестве модального глагола выражает обязанность, желательность действия, совет, рекомендацию. На русский язык **should** переводится как *следует, должен, обязан*:

You **should** know about it. Вам следует знать об этом.

Would

Глагол **would** в качестве модального глагола может выражать:

а) обычные и повторяющиеся действия в прошлом (в этом значении он является синонимом выражению **used to**):

He **would** spend hours in the Tretyakov Gallery. Он обычно проводил многие часы в Третьяковской галерее.

He **used to** spend hours in the Tretyakov Gallery. Он любил проводить многие часы в Третьяковской галерее.

б) упорное нежелание выполнить какое-то действие:

I asked him to do it but he **wouldn't**. Я попросил его сделать это, но он ни за что не хотел.

в) присущее свойство, характеристику (часто встречается в технической литературе):

Paper **would** burn. Бумага хорошо горит.

Need

Need может употребляться как модальный глагол и как правильный глагол. Как модальный глагол **need** имеет только одну форму. Он в основном употребляется в отрицательных предложениях:

You **needn't** come here today. Тебе не нужно приходить сюда сегодня.

ПРЕДТЕКСТОВЫЕ УПРАЖНЕНИЯ

Упражнение 1. Прочитайте диалоги, обращая внимание на употребление модальных глаголов.

Dialogue 1

- A: You can do without lots of things.
B: You can't do without food or water.
A: Oh, yes, you can! You can do without food for weeks and without water for days.
B: Well, you can't do without air or only for a very short time.

Dialogue 2

- A: Can you write without a pen?
B: No, of course, I can't.
A: I must have a new dictionary.
B: Why must you? You don't need a new dictionary. You've got a lot of dictionaries.

Dialogue 3

- A: I want to see Mr. Z.
B: I am sorry. I am afraid he may not be in.
A: But perhaps he may be.
B: No, sir. He may not be back for some time.
A: I can wait.
B: He may not be in until twelve.
A: I can wait until he is in.
B: He may be out all day.

Dialogue 4

- A: May I go to the cinema?
B: No, not today, tomorrow.
A: May not I go today? Zed can't come tomorrow. May I go home with Zed afterwards?
B: Oh, no, you mustn't do that.
A: Why, mustn't I?
B: Because you mustn't be home late.
A: Well, then, may Zed come home with me?

B: Yes, he may do that.

Упражнение 2. Замените модальные глаголы соответствующими эквивалентами.

1. Students must take exams in January. 2. She can speak French well. 3. You may take this book till tomorrow. 4. We must learn new words every week. 5. I live not far from my work. I can go by bus or I can walk. 6. You may come in. 7. We can take this book from the library. 8. She cannot do this work in time. 9. He must go to St. Petersburg for a few days. 10. We can see electrical devices everywhere.

Упражнение 3. Поставьте предложения в вопросительной и отрицательной формах.

1. We were able to read that article in the library. 2. Some students will be permitted to take exams in December. 3. You have to read this book. 4. We shall be able to skate in winter. 5. My friend is to take part in the conference. 6. The students of our group had to go to the plant last week. 7. They were allowed to continue their research.

Упражнение 4. Переведите предложения, обращая внимание на перевод модальных глаголов.

1. Everyone should know a foreign language. 2. To make supercomputers, we need highly developed electronics and new materials. 3. One should do one's work in time. 4. The students ought to know the history of their institute. 5. The development of new materials does not mean that old materials should lose their significance. 6. Marie Curie needed a laboratory and equipment for her research. 7. Every institute ought to be proud of their famous graduates. 8. One should know that «roentgen» is a unit (единица) of radiation.

Упражнение 5. Замените *would* на *used to*, где возможно, и переведите.

1. He would spend hours in the Tretyakov Gallery. 2. Tsiolkov-sky believed that rockets would be used for space travel. 3. Bell and Watson would repeat their experiments many times. 4. It became known that a new car would be shown at the exhibition. 5. Electricity would pass through metals, but wouldn't pass through wood. 6. I asked my friend to

help me, but he wouldn't, he said I could do everything without his help.
7. He would work in the library when he was getting ready for his exam.

Упражнение 6. Выберите правильный модальный глагол или его эквивалент.

можно вычислить — (must, can, should) calculate; быть в состоянии выполнить — (have to, be able to, be allowed to) carry out; нельзя предсказать — (can't, needn't, be not able to) predict; должны начаться в 10 — (have to, may, be to) begin at 10; следует знать — (should, may, need) know; не нужно создавать — (may not, needn't, should not) create; необходимо использовать — (must, be allowed, may) use; можно взять эту книгу — (must, can, may) take this book; упорно не желать сделать — (need, wouldn't, must) do.

Упражнение 7. Переведите предложения.

1. Он может читать и писать по-английски. 2. Она должна сделать эту работу в конце месяца. 3. Теперь студенты могут войти в аудиторию. 4. Она может заниматься здесь. 5. Он должен прочитать эту статью. 6. Можно мне взять ваш учебник? 7. Я должен пойти в библиотеку и взять книги. 8. Можно мне поехать с вами? 9. Умеет (может) этот ребенок ходить? 10. Вы должны вернуть книгу завтра.

Упражнение 8. Переведите выделенные словосочетания.

1. **It was found that** proton and neutron have almost the same weight. 2. **It was necessary** to lay cables across the Atlantic Ocean as there were no radio or satellites at that time. 3. **It is difficult** to imagine the world we live in without radio, telephone and television. 4. **It is possible** to have a direct telephone talk with Vladivostok with the help of satellite systems. 5. This material has properties which **make it useful** for various space projects. 6. **It should be said that** computers become increasingly important in our life and work. 7. My adviser **considers it necessary** for me to read as much literature as possible before starting my work. 8. **It is difficult** to name all the branches of science and technology which are based on electronics. 9. **It is well-known that** «watt» is a unit named after James Watt, an inventor from Scotland. 10. **It is impossible** to

solve many modern complex engineering problems without the help of computers.

Упражнение 9. Укажите, чем выражено отрицание. Переведите.

1. Popov had no support from the government to continue his research.
2. Not long ago chemists developed new materials that could withstand high temperatures.
3. No system of measurement of the past is as simple as the metric system.
4. It is no longer possible to put off the solution of ecological problems.
5. Tsarist Russia gave no money for Tsiolkovsky's research.
6. No one is allowed to smoke in our office.
7. There is no doubt (несомненно) that the development of electronics is one of the greatest achievements of mankind.
8. Half a century is not a long period in the history of civilization.
9. Before Newton no one could explain why the planets moved around the Sun.
10. People no longer think of radio and television as something fantastic.

Упражнение 10. Переведите предложения с составными предлогами *due to, thanks to, because of*.

1. Ships can communicate over long distances due to the radio.
2. Because of the earth's rotation there are days and nights on the earth.
3. Thanks to the radio it is possible to transmit human voice across the globe.
4. Due to the latest achievements in electronics it has become possible to develop supercomputers.
5. Because of their long life solar and atomic batteries are used to supply power to transmitters in spacecrafts.
6. Thanks to the development of radio telescopes radio astronomy has made great achievements.
7. Our century can be called «Space Age» because of the development of a new branch of science and technology — cosmonautics.

Упражнение 11. Переведите предложения, обратив внимание на слово *much* перед прилагательным в сравнительной степени.

1. We don't notice the gravitational pull of a book because the pull of the earth is much greater.
2. The speed of computer operations will be much greater in the future.
3. Graphite which withstands much higher temperatures is one of the best materials for reactors.
4. When a spaceship is in space, much smaller energy is needed for its movement.

Упражнение 12. Переведите предложения и запомните значения глагола *to cause*.

1. Heating causes different changes in metals. 2. A Danish scientist discovered that electricity caused the needle to move from left to right. 3. Vibration not only causes noise but can also break materials and structures. 4. The space flight of Gagarin caused a sensation throughout the world. 5. Rutherford showed that positive charge of a nucleus was caused by protons. 6. New achievements in mathematics caused the development of new means of computerization.

СЛОВООБРАЗОВАНИЕ

Упражнение 13. А. Образуйте и переведите следующие производные слова согласно образцу:

существительное + -ful = прилагательное	<i>use — польза → useful — полезный</i> power, skill, success;
существительное + -less = прилагательное	<i>use — польза → useless - бесполезный</i> change, noise, water, help, end;
прилагательное + -ness = абстрактное существительное	<i>weightless — невесомый → weightlessness — невесомость</i> useful, dark, hard, weak;
существительное или прилагательное + -ist = существительное	<i>science — наука → scientist — ученый</i> special, art, motor, biology.

В. Переведите существительные с суффиксами *-ance/-ence* :

сущ. с суффиксами -ance, -ence	<i>resistance — сопротивление</i> consequence, distance, appearance, difference, absence, presence.
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СЛОВА И СЛОВСОЧЕТАНИЯ ДЛЯ ЗАПОМИНАНИЯ

aim *v* — стремиться, целиться
alloy *n* — сплав

launch *n* — запуск
liquid *n* — жидкость, *a* — жидкий

approach *v* — приближаться, подходить

certain *a* — определенный

condition *n* — условие *create*

v — создавать

consequently *adv* — следовательно

data *n* — данные

density *n* — плотность

differ from *v* — отличаться от

difference *n* — различие, разница

estimate *n* — оценивать

except for — кроме, за исключением

i.e. [that is] — то есть

include *v* — включать

manned *p* — пилотируемый, с человеком на борту

movement *n* — движение

numerous *a* — многочисленный

obtain *v* — получать

possess *v* — обладать, владеть

thus *adv* — так, таким образом

valuable *a* — ценный

prove *v* — доказывать

substance *n* — вещество

surface *n* — поверхность

vehicle *n* — транспортное средство, космический летательный аппарат **weight** *n* — вес

Текст 6А

Прочитайте текст и найдите абзацы, в которых сообщается о результатах и значении проведенных экспериментов по производству материалов в космосе. Переведите

Made in Space

This label «Made in Space» for industrial materials will probably surprise no one in the not so distant future. They may include superconductors, new kinds of alloys, substances with peculiar magnetic properties, supertransparent laser glass¹, polymers, plastics, and so on. Numerous experiments carried out at the Russian orbital space stations have paved the way² to the development of methods and means of industrial production of new materials of better quality on board a spacecraft³. Experts estimate that within a few coming years industrial production of various materials will be started in space.

Conditions on board a space vehicle orbiting Earth greatly differ from those on its surface. However, all of these conditions can be simulated⁴ on Earth, except for one — prolonged weightlessness. Weightlessness can be created on Earth, but only for a few seconds. A space flight is another matter: a satellite orbiting Earth is in a dynamic

zero-gravity state, i.e., when gravity is cancelled out⁵ by inertia.

What can weightlessness be used for? Many well-known processes go on differently due to the absence of weight. The Archimedes principle is no longer valid and, consequently, stable-state⁶ liquid mixtures can be obtained, the components of which would immediately separate on Earth because of different density. In case of melts⁷ of metals, glasses or semiconductors, they can be cooled down to the solidification point even in space and then brought back to Earth. Such materials will possess quite unusual qualities.

In space there is no gravitational convection⁸, i.e., movements of gases or liquids caused by difference of temperatures. It is well-known that various defects in semiconductors occur because of convection. Biochemists also have to deal with the worst aspects of convection, for example, in the production of superpure biologically active substances. Convection makes it very difficult on Earth.

Following the launch of the first orbital stations the specialists started experiments aimed at proving the advantages of the zero-gravity state for the production of certain materials. In this country all orbital stations from Salyut 5 onwards were used for that purpose, as well as rockets. Since 1976 over 600 technological experiments have been carried out on board manned and unmanned space vehicles.

The experiments proved that many of the properties of the materials obtained under the zero-gravity condition were much better than those produced on Earth. Besides, it has been established that it is necessary to develop a new science — physics of the weightless state — which forms the theoretical basis for space industry and space materials study. This science has basically been developed. The methods of mathematical modelling of the hydromechanical process under the zero-gravity condition have been created with the help of computers.

Special space vehicles will also be needed for industrial production of new-generation materials. Research has shown that the acceleration rate on board these vehicles must be reduced to the minimum. It was found that space platforms in independent flight carrying the equipment were most suitable for producing materials. These vehicles will have to use their own propulsion systems to approach their base orbital station after a certain period of time. The cosmonauts on board the station can replace the specimens. Many new and very interesting projects are

planned for orbital stations. Here is one of them. Convection does not allow to grow large protein crystals on Earth. But it is possible to grow such crystals under the zero-gravity condition and to study their structure. The data obtained during the experiments can be useful for the work of laboratories on Earth in using the methods of gene engineering⁹. Thus, it may be possible to make new materials in space and also to obtain valuable scientific data for new highly efficient technologies on Earth.

Preparatory work for industrial production in space at a larger scale is being carried out in Russia, the USA, Western Europe and Japan. It should be said that according to the estimates of American experts production of materials in space is to bring 60 billion dollars in the future.

Notes to the Text

1. supertransparent laser glass — сверхпрозрачное лазерное стекло
2. to pave the way — проложить путь
3. on board (a spacecraft) — на борту (космического корабля)
4. to simulate — моделировать, имитировать
5. to cancel out — уничтожать, уравнивать
6. stable-state — устойчивое состояние
7. in case of melts — в случае расплавов
8. gravitational convection — гравитационная конвекция (перенос тепла под действием силы тяжести)
9. gene engineering — генная инженерия

УПРАЖНЕНИЯ

Упражнение 13. Просмотрите текст 6А и ответьте на вопросы.

1. What is this text about? 2. Have you seen the label «Made in Space» anywhere? 3. Why can't certain materials be produced on Earth? 4. Can all the conditions on board a space vehicle be simulated on Earth? 5. When will it be possible to start industrial production of materials in space? What do you think about it? Can we start such production now? 6. Why can we obtain materials of better quality in space? 7. What equipment is needed for producing materials in space? 8. How will this equipment operate?

Упражнение 14. Составьте утверждения, выбрав правильный вариант согласно тексту 6А.

1. Many well-known processes go on differently in space due to
 - a) different density.
 - b) the presence of weight.
 - c) the absence of weight.
2. The components of stable-state liquid mixtures would separate on Earth because of
 - a) high temperature.
 - b) different density.
 - c) different conditions.
3. It is well-known that various defects in semiconductors occur because of
 - a) weightlessness.
 - b) solidification.
 - c) convection.

Упражнение 15. Найдите в тексте 6А модальные глаголы и их эквиваленты. Замените эквиваленты соответствующими модальными глаголами.

Упражнение 16. Выберите соответствующий модальный глагол.

1. Do you live far? (Can, must) we meet here at 7 o'clock? — We certainly (may, can). — I'll see you later this evening, then. 2. Bill, would you help me? Sure, I'd be glad to help you. What (may, can) I do for you? 3. (Can, may) I take your pen? I've broken mine. 4. Do you know when Bob comes back from the University? I am afraid he (can, may) be very late. He has an examination tomorrow. He (can, must) study for the examination. 5. Do you have a stamp (марка)? — No, I'm afraid I don't. You (may, must) go to the post office for this. 6. I'm very much interested in environment problems. I think we (must, may) learn to live in harmony with nature.

Упражнение 17. Укажите предложения с модальными глаголами, выражающими необходимость совершения действия. Переведите.

1. As telegraph wires couldn't be hung over the ocean, cables had to be laid on the floor of the Atlantic Ocean. 2. In the next few years engineers are

to develop computers of more than 2 billion operations a second. 3. A new kind of telephone may be called a video-phone. 4. One must know that we shall need a lot of specialists that will be able to work and live in space for a long time. 5. To see distant objects clearly, one should change the focus. 6. Within a few coming years a quantity production of various materials is to begin in space. 7. Some liquid mixture components would immediately separate on Earth because of different density. 8. It should be said that special space vehicles are necessary for industrial production of space materials. 9. Our group will be allowed to use new laboratory equipment next term. 10. One can see that there is no principal difference between iron and copper as conductors.

Упражнение 18. Найдите предложения с эквивалентами модальных глаголов *to have to*, *to be to*.

A. 1. Television has a great number of uses nowadays. 2. Morse discovered that telegraph messages did not have to be written, they could be sent as a sound. 3. That part of this country has become a highly industrial one. 4. Why couldn't you do it yesterday? — Because I had to go home earlier than usual. 5. This important problem had been solved by the end of 1980. 6. In the past messages to and from Europe had to be sent by ship. 7. Some materials with useful qualities will have to be produced in space. 8. A historian has to study a lot of various facts to be able to reconstruct the far past.

B. 1. Such metals as iron, cobalt, nickel and some alloys are much more magnetic than any other substances. 2. In the next few years Russian engineers are to complete the work on supercomputers. 3. The main aim of this article is to explain methods and means of space industrialization. 4. We are living in an electronic world. 5. A number of TV stations are to be linked up into a network. 6. Experiments for industrial production of materials in space are being carried out in many countries. 7. Weightlessness is created on Earth, but only for a few seconds. 8. The quality of these metal parts is to be very high. 9. It was found that the acceleration rate on board such vehicles was to be reduced to a minimum.

УПРАЖНЕНИЯ ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ

Упражнение 19. Напишите глаголы, соответствующие словам.

surprisingly, difference, equipment, mixture, coming, estimation, weightlessness, production, separately, development, movement, disappearance, functional.

Упражнение 20. Образуйте прилагательные от существительных.

magnet, industry, absence, speciality, weight, probability, orbit, dynamics, preparation, supertransparency, independence, gravitation, superpurity, difficulty, variety.

Упражнение 21. Переведите слова, учитывая значение префикса *super-*.

supercritical, superactive, supercooled, superalloy, superhard, superplastic.

Упражнение 22. Дайте для следующих слов:

а) синонимы

to start, movement, nowadays, quality, research, various, a means, manufacture, possess, to occur, consequently, numerous, spacecraft, to use, to substitute, certain;

б) антонимы

distant, to stop, few, to reduce, invaluable, unusual, dependence, minimum.

Упражнение 23. Выберите английский эквивалент русского предложения из предлагаемых вариантов.

1. Он должен идти домой.

He may go home. He must go home. He had to go home.

2. Он должен идти домой в 5 часов.

He must go home at 5 o'clock. He is to go home at 5 o'clock. He may go home at 5 o'clock.

3. Он может идти домой в 5 часов.

He may go home at 5. He can go home at 5. He must go home at 5.

4. Он должен будет идти домой раньше.

He must go home earlier. He should go home earlier. He will

- have to go home earlier.
5. Ему следует идти домой.
He should go home. He may go home. He had to go home.
 6. Он может очень быстро ходить.
He can walk very quickly. He will be able to walk very quickly. He could walk very quickly.
 7. Ему разрешат идти домой после трех.
He is permitted to go home after 3. He was permitted to go home after 3. He will be permitted to go home after 3.
 8. Ему не нужно идти домой сразу.
He is not allowed to go home at once. He could not go home at once. He needn't go home at once.

Упражнение 24. Переведите без словаря.

The first step in any industrialization project, for example, on the Moon should be preparation for plant construction. It is economically desirable to use local materials for this. It is well-known that metals form the most important group of engineering materials. One must know that they possess necessary mechanical and physical properties. They can be easily fabricated into various forms by a variety of techniques. They are hard, tough (пластичный), strong and temperature-resistant, a combination of properties not available in any other materials. The properties of metals can be changed by heat treatment so that the fabrication is much easier since the work pieces can have properties quite different from those needed in the final product.

CONVERSATION

Exercise 1. Answer the questions.

1. What condition on board a space vehicle can't be simulated on Earth? (prolonged weightlessness).
2. What eliminates gravity during a space flight? (inertia).
3. What can be the industrial use of weightlessness? (the production of new materials with unusual properties).
4. What industrial materials can be produced in space? (superconductors, new kinds of alloys, magnetic materials, laser glass, polymers, plastics, etc).
5. What is Russia's contribution to the development of methods and means of industrial material production in

space? (over 600 technological experiments carried out at the Russian orbital space stations). 6. What are the results of these experiments? (much better properties of the materials obtained under the zero-gravity condition than those produced on Earth). 7. What is needed for industrial material production in space? (special space platforms).

Exercise 2. Make a sentence out of the two parts:

1. Experts estimate that within a few coming years	1. for industrial production of larger scale is being carried out in Russia, the USA, Europe and Japan.
2. Numerous experiments on board	2. very difficult on Earth.
3. They may include	3. i.e. movement of gases or liquids because of difference of temperatures.
4. In space there is no gravitational convection	4. to grow large crystals and to study their structure.
5. Convection makes the production of some materials	5. super and semiconductors, metals, glasses, superpure biologically active substances, etc.
6. But in zero-gravity conditions it is possible	6. the industrial production of various materials is to begin in space.
7. It should be said that research and preparatory work	7. the Russian manned and unmanned space vehicles and space stations proved the advantages of the zero-gravity state for the production of some materials.

Exercise 3. Speak about:

1. Space industrialization and its importance for mankind.
2. The latest achievements in industrial materials production in space.

Use exercises 1, 2 and the following words and word combinations for your topic : carry out experiments; obtain useful and valuable data; on board a space vehicle; zero-gravity condition; zero-gravity state advantages, materials of better quality; at a larger scale; in case; according to.

Text 6B

Прочитайте текст и расскажите о новом способе повышения пластичности и износостойкости режущего инструмента из композиционной керамики.

Composite Ceramics

Advanced ceramic materials have such interesting properties that mechanical engineers are becoming more and more interested in their use as structural parts (конструкционные детали).

Ceramic cutting tools have been in use for some time. However, it is only during the last twenty years that there has been rapid development in this field because of the development of new composite ceramics.

Composite materials are materials in which two or more different substances, such as metals, ceramics, glasses, or polymers are combined without chemical reaction. As a result one can produce a material with properties different from those of any of the individual constituents. The constituents of a composite would retain their individual characteristics.

Recently engineers have developed various kinds of composite ceramics which must combine an increased toughness (пластичность) with the same hardness and strength of usual ceramics. A promising recent development is the addition of a tiny quantity of metal to increase toughness and tool life. Thus, at room and high temperatures (1000 °C) the composite ceramics for cutting tools should possess the following properties: high strength, high toughness, high hardness, high thermal shock resistance and high chemical inertness.

Text 6C

Прочитайте текст, выделите интересные для вас факты и перескажите.

Ancient Steel-Making Secret

When two metallurgists at Stanford University were trying to produce a «superplastic» metal they became interested in the secret of Damascus steel, the legendary material used by numerous warriors (воины) of the past, including Crusaders (крестоносцы). Its formula had been lost for generations.

Analyses of a new steel revealed properties almost identical to those they found in Damascus steel, although their own plastic steel had been produced by present-day methods.

The remarkable characteristics of Damascus steel became known to Europe when the Crusaders reached the Middle East in the 11th century. They discovered that swords (меч) of the metal could split (рассечь) a feather (перо) in air and at the same time retain their edge sharp through many battles.

The secrets of Damascus steel were known in many parts of the ancient world, especially in Persia, where some of the finest specimens were produced. For eight centuries the Arab sword makers kept the secret about their techniques and methods. And with the invention of firearms (огнестрельное оружие), the secret was lost and it was never fully rediscovered.

The two metallurgists carried out a lot of researches. When they realized that they might be close to the discovery of a new material, a sword fancier (знаток), at one of their demonstrations, pointed out that Damascus steel, like their own product, was very rich in carbon. This led them to conduct a comparative analysis of their steel and those of the ancient weapons. As a result, it was found that a basic requirement was a high carbon content. The two metallurgists believed it had to be from 1 per cent to 2 per cent, compared to only a part of 1 per cent in ordinary steel. Their research showed how to make steel of even greater hardness than Damascus steel.

ДОПОЛНИТЕЛЬНЫЕ ЗАДАНИЯ

Упражнение 1. А. Прочитайте следующие выражения из текста 6А и постарайтесь догадаться о значении выделенных слов и словосочетаний.

1. this **label** «Made in Space»
2. in the not so **distant** future
3. with **peculiar** magnetic properties
4. **prolonged** weightlessness
5. The Archimedes principal is no longer **valid**
6. the theoretical **basis** for space industry
7. **on board** these vehicles; **on board** orbital station
8. **preparatory** work for industrial production in space
9. replace the **specimens**

В. Подберите к каждому выделенному в А слову соответствующее ему по значению.

- a. well based, correct, effective
- b. needed for preparing; introductory
- c continuing for a long time
- d. foundation
- e. in a ship
- f. not so far away in time
- g. special, particular
- h. piece of paper, metal or other material used to describe what smth. is, where it is to go, etc.
- i. one as an example of a class

Упражнение 2. А. Прочитайте текст и постарайтесь догадаться о значении терминов *shape memory alloy, suggest, remember, piston, contract, expand, engine*.

Shape memory alloys (SMA) are in general usage today. What exactly is a SMA? As the name suggests, this alloy can remember its original shape or form. Essentially it is a metal which can be deformed when cold and will return to its first shape when hot.

The particular alloy we are speaking about is nickel titanium. We can see here one application in a conventional piston. When the piston

is cold, the SMA coil or spring contracts and so the piston does not move. Heat causes it to expand and consequently the piston moves up. The advantage is that the device can work without any mechanical power, just from the heat which is supplied by the engine itself.

В. Найдите в приведенном выше тексте 5 пар синонимов и 3 пары антонимов.

Упражнение 3. Замените выделенные словосочетания соответствующими глаголами *expand*, *remember*, *contract*, *suggest*, *deform*.

The name SMA **causes us to think** that such an alloy can **keep in memory** its original shape. In other words it can **change its shape**. When cold it **gets smaller**. When hot it **gets bigger**.

Упражнение 4. Составьте возможные словосочетания из глаголов в колонке А и существительных из колонки В, переведите их и запомните.

А	В
1. make 2. meet 3. obtain/provide 4. lay 5. state 6. find 7. develop 8. send/transmit/receive 9. have 10. perform 11. watch	a. the basis, foundation b. application, a way c an operation d. an advantage over, influence on e. data, results, access to f. information, a message, signal g. an experiment, a TV program h. a law i. a decision, mistake, calculation j. equipment, a device, design, system k. requirements

Упражнение 5. Составьте, переведите и запомните словосочетания с глаголом *to be*.

famous for, of great importance, in general (common) use (usage), of great help, interested in.

Упражнение 6. Заполните таблицы на словообразование.

Noun	Adjective	Opposite Adjective
use thought care	••• thoughtful •••	••• hopeless •••

Adjective	Noun	Noun, Adjective	Noun
hard	•••	journal	•••
tough	toughness	science	•••
useful	•••	economy	•••
•••	uselessness	•••	metallurgist
hopeful	•••	active	•••
•••	hopelessness	•••	humanist
•••	carefulness	chemistry	•••
careless	•••	•••	physicist

Упражнение 7. Speak about:

A new alloy or advanced composite material you have recently read or heard about, its properties and possible uses.

REVISION OF MODULES 4-6

Упражнение 1. Повторите способы выражения определения. Найдите определения и переведите предложения.

A. 1. This is an excellent computer which will give you many years of service. 2. The number of men present was small. 3. Personal laser printers cost less than ordinary laser printer. They also weigh less and require less space. 4. Do you know the total number of colours available on this graphics system? 5. Supercomputers capable of performing billions of operations a second will have to be developed soon. 6. Ten miles is a long distance to walk. 7. Any mechanic could do that job. 8. Digital television has many features that are absent from conventional TV, such as easy connection to computers and telecommunication networks. 9. E-mail is a very fast data communication service. For e-mail to get a message to the other side of the world is a matter of a second or two. 10. The factory has computer controlled production equipment.

B. 1. Tell me about the report you are preparing now. 2. A new radio set Ted has is a Zenith. 3. Ten hours of work a day is the maximum you should do. 4. Do you know about the disco the University is organising? 5. The news we have heard this week is of great importance. 6. You have been given all the information you need. 7. I collected all the information I could find on the Internet about this subject. 8. With the new system you will be able to generate statistics any time you want. 9. Writing letters and reports are the purposes most people use computers for. 10. Composite materials we learnt about are the combination of metals, ceramics, glasses and polymers produced without chemical reactions. 11. Weightlessness the production of new materials depend on cannot be created on the earth for a long period of time. 12. The TV sets people saw at the New York Fair in 1939 were not available for a long time because of World War II. 13. Metals, ceramics, glasses, polymers composite materials consist of have properties different from those of the obtained composite material.

Упражнение 2. Прочитайте и переведите тексты, обращая внимание на проработанную грамматику и лексику 4, 5, 6 уроков.

The Monitor

We interact with computers by entering instructions and data into them. After the information has been processed (обрабатывать), we can see the results (i.e. the output) on the visual display unit (VDU — устройство виртуального отображения) or the monitor. In this interactive process with the computer, the screen plays an important part.

The pictures and the characters (символы) we see on the screen are made up of picture elements which are also called pixels. The total number of pixels the display is divided in (both horizontally and vertically) is known as resolution. When the number of pixels is very large, we obtain a high resolution display and therefore a sharp image. If the number of pixels is small, a low resolution is obtained. Thus, pixel density or resolution affects the quality of the image: a larger number of pixels gives a much clearer image.

The cathode ray tube of the monitor is very similar to that of a TV set. Inside the tube there is an electron beam which scans the screen and turns on or off the pixels that make up the image. The beam appears in the top left corner, and scans the screen from left to right in a continuous sequence, similar to the movement of our eyes when we read, but much faster. This sequence is repeated 50, 60 or 75 times per second, depending on the system.

In a colour monitor, the screen surface is coated (покрывать) with substances called phosphors. Three different phosphor materials are used — one each for red, green and blue. A beam of electrons causes phosphor materials to give coloured light from which the picture is formed. Colour monitors are capable to display many different colours at the same time.

Portable computers use a flat liquid-crystal display (LCD) instead of a picture tube.

Super Phones

Not long ago it became known that cell phone manufacturers were experimenting with several different designs for the handheld devices that would be linked to the advanced wireless networks of the future. If

these machines really are to become digital companions, they will have to be versatile, adaptable and fashionable (модный). Companies such as Nokia, Ericsson and Motorola are working on the third-generation «super phone» that will look quite different from existing cell phones. In fact, calling them phones seems absurd (неразумный). They will have built-in colour screens several inches square for presentation of high resolution graphics and video. Some may have a keyboard and a miniature mouse for data input, but most of them will use touch-sensitive (сенсорный) screens and styluses (перо, пишущий узел) like those employed now by the handheld computers.

In addition to carrying voice communication, the super phone will also be able to play music files that are circulating on the Web in the most popular MP3 format (or in whatever format may replace it).

Упражнение 3. Объясните значение следующих словосочетаний. Например:

material properties — *the properties of a material*;

colour monitor — *a monitor that works in colour*;

company's database — *the database which belongs to the company*.

1. light beams
2. pixel number, pixel density
3. eye movements
4. director's computer
5. printing device
6. new generation computer
7. pocket-sized computer
8. handheld phones
9. high resolution display
10. high speed electronic circuits
11. computer controlled production equipment

Упражнение 4. Подберите к словам из колонки А их объяснение из колонки В.

А	В
pixel	a. the maximum number of pixels in the horizontal and vertical directions of the screen
monitor	b. the results produced by a computer

resolution	c the smallest element of a display surface
character	d. read the image as a series of pixels to enter information into the computer's memory
computer	e. the picture tube of the display which is made of glass and contains a vacuum
CRT	f. a CRT device which displays the computer output
image	g. a symbol available on the keyboard
scan	h. the machine that stores and processes data
output	i. a picture or what is seen on a television or computer screen

Упражнение 5. А. Заполните пропуски словами:

pixel, certain, Web, stylus, chip, perform, CPU, mouse
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1. A ... is a tiny piece of silicon containing a set of integrated circuits.
2. The ... directs and coordinates the operations taking place within the computer system.
3. The arithmetic logic units ... calculations on the data.
4. The common name for picture elements is ...
5. On colour systems, each pixel is a ... combination of the three primary colours: red, green, and blue.
6. ... is a system by which one can navigate through the Internet and find news, pictures, virtual museums, electronic magazines — any topic you can imagine.
7. What makes the ... especially useful is that it is a very quick way to move around on a screen.
8. A ... is a pen-like input device used to write directly on the screen to enter data.

B. Speak about:

The next generation mobile phones.

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