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ПОСОБИЕ ПО ПРАКТИЧЕСКОЙ ГРАММАТИКЕ АНГЛИЙСКОГО ЯЗЫКА

Утверждено Редакционно-издательским советом университета в качестве учебного пособия

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Цель пособия – развитие навыков перевода грамматических явлений, наиболее характерных для научно-технической литературы по специальностям вуза. Примеры, представленные в пособии, взяты из оригинальных источников и основаны на общенаучной лексике и научно-технической терминологии. Содержит систему упражнений, направленных на закрепление видовременных форм глагола изъявительного и сослагательного наклонения, структур с модальными глаголами, неличных форм глаголов.

Предназначено для студентов 1-2 курсов дневного отделения I-VI факультетов. Может быть использовано для аудиторной работы под руководством преподавателя.

Рецензент О. Н. М а р и н и н а

UNIT 1
FINITE FORMS OF THE VERB

Tenses in the Active and Passive Voice

I. The Active Voice

Tense	Aspect			
	Simple	Continuous	Perfect	Perfect Continuous
Present	**V, V-s** *I, you, we, they* } V *He, she, it* } V-s	**be V-ing** I am V-ing *He, she, it* } is V-ing *We, you, they* } are V-ing	**have V_3** *I, you, we, they* } have V_3 *He, she, it* } has V_3	**have been V-ing** *I, you, we, they* } have been V-ing *He, she, it* } has been V-ing
	Do, Does □V?	*Am, Is, Are* □ V-ing?	*Have, Has* □ V_3?	*Have, Has* □ been V-ing?
	□ *do, does* not V	□ *am, is, are* not V-ing	□ *have, has* not V_3	□ *have, has* not been V-ing
Past	**V-ed, V_2** *I, you, they, we, he, she, it* } V_2V-ed	*was, were* } **V-ing** *I, he, she, it* } **was V-ing** *We, you, they* } **were V-ing**	**had V_3** *I, you, we, they, we, he, she, it* } had V_3	**had been V-ing** *I, you, we, they, we, he, she, it* } had been V-ing
	Did □ V?	*Was, Were* □ **V-ing**	Had □ V_3?	Had □ been V-ing?
	□ did not V	□ *was, were* **not V-ing**	□ had not V_3	□ had not been V-ing
Future	*Shall, Will* V I,we *Shall, Will* V	*Shall, Will* be V-ing I,we *shall, will* be V-ing *He, she, it, you, they* } will be V-ing	*Shall, Will* have V_3 I,we *shall, will* have V_3 *He, she, it, you, they* } will have V_3	*Shall, Will* have been V-ing I,we *shall, will* have been V-ing *He, she, it, you, they* } will have been V - ing
	Shall, Will □ V?	*Shall, Will* □ be V-ing?	*Shall, Will* □ have V_3?	*Shall, Will* □have been V-ing?
	□ *shall, will* not V	□ *shall, will* not be V-ing	□ *shall, will* not have V_3	□ *shall, will* not have been V-ing?

I. Translate the sentences. Define the tense-form and the aspect of the predicate.

A.

1: Modern industry requires materials capable of working in diverse conditions.

2. At the beginning of the 20-th century people did not think of flying at or above the speed of sound.

3. The main advantage of using gas as a fuel is that it burns with a smokeless flame and burns up with hardly any waste.

4. This process will result in the rearrangement of components.

5. The mass of an atom does not determine its chemical properties the latter depends primarily upon the charge of its nucleus.

6. The theory gave a satisfactory explanation of experimental facts.

7. The power station will operate on a dual pressure steam cycle with the turbine high pressure cylinder designed to accept steam at two pressures.

8. The term operation implies to some extent a repetition of some action or some parts of an action.

9. The circumstances were favourable and we completed our work in time.

10. Electronic computers calculate the trajectories of spaceships, help to prepare, launch and monitor the rockets that carry the most complicated and sophisticated equipment.

11. The method of cooling suggested by this engineer will improve the engine's efficiency.

12. A body at high temperature gives up heat to the surrounding air and heats it.

13. These experiments left little doubt that such phenomena exist.

14. The question is whether this scientific model will apply to the industrial plant.

15. The regulation of the speed of machines was the earliest application of closed-loop control systems.

16. Electronics gives the space pilots easy control for soft landing on other planets.

17. Faraday's natural scientific conception created a revolution in the understanding of electrical phenomena.

18. Collision-warning radars will operate automatic control if there is a danger of meteor hitting the spaceship.

B.

1. Science is becoming a leading factor in the progress of mankind.

2. Water was pouring from the hole at a rate of three hectoliters per minute.

3. The importance of space means of communication is increasing every year.

4. Almost every processing industry is now exploring the use of microwave heat.

5. We will be living in a different world in the future: machines will be doing many jobs, that are done by people today, we will by travelling to other planets regularly and someone from other planets will be visiting the Earth.

6. We were watching a new double planet formation.

7. Scientists of different countries are successfully developing quantum generators called lasers, and are looking for practical uses for a new kind of ray which is millions of times brighter than the sun.

8. What will you be doing in the laboratory tomorrow morning? We shall be watching the operation of a new device.

9. He made several mistakes when he was typing the paper.

10. The smaller the phenomena man is investigating, the bigger, costier, and more complex is the equipment needed to conduct such research.

11. Scientists and engineers were concentrating their attention on developing a power generating installation.

12. In an open system information is continually flowing within the system and between the system and its environment.

13. What will she be doing next term? She will be lecturing at the university.

14. He was looking through the morning mail when his boss called him.

15. They were listening to the story told by a survivor of the terrible earthquake.

16. The force of gravity is pulling us downwards towards the centre of the earth.

17. He will be interviewing a foreign delegation at this time tomorrow.

18. Radioactive materials are constantly undergoing a change.

C

1. These scientists have succeeded in designing a small-dimensioned electronic device.

2. Achievements in the studying of atom structure have opened up new, practically unlimited possibilities to humanity for further mastering of nature's forces.

3. This conference had provided an opportunity for an exchange of views on the techniques, problems and future development of automatic programming.

4. Mankind has never experienced changes in life and work on such a scale.

5. Have you already finished your diploma work? No, I shall have finished it by the end of June.

6. This design bureau has developed and brought to mass production a series of highly reliable liquid propellant engines for launch vehicles of various class and destination.

7. Electronics has widened our vision and given us the chance to see the microworld more clearly.

8. The factory will have fulfilled the plan by the end of December.

9. They will have prepared all the documents by the time the director returns.

10. I had already read two chapters of the book when you came yesterday.

11. Rapidly advancing technology of satellites has made critical the need for smaller electronic components.

12. From the earliest times human beings have wondered about the shape of the earth.

13. We have expressed satisfaction with the design that was so original.

14. By the beginning of the lecture the laboratory assistant had brought all the necessary diagrams.

15. Practically every advancement in the aerospace industry has depended on new and better materials.

16. By the end of the year scientists and designers will have developed a new generation of robots.

17. The design and the use of servomechanisms have grown to be an extremely important part of electric and mechanical technology.

18. Modern science has had more successes than failures in its most highly developed departments, notably in physics, astronomy, and genetics.

D

1. Our researches have been investigating the problems of environmental protection for three years now.

2. I had been working on my report for some hours when he came.

3. By the 1st of January he will have been working at the laboratory for six years.

4. He has been following this scientist's research with great interest for many years.

5. When you enter the university you will have already been studying English for more than seven years.

6. They have been developing a very fine technology for obtaining transistors with pre-set physical properties since last year.

7. They have been discussing the results of the experiment since early morning.

8. More recently this method of analysis has been growing in favour and it will probably find use in certain manufacturing processes.

9. Measuring instruments have been reporting the temperature, pressure, rate of flow since the beginning of operation of a test installation.

10. By the end of the month they will have been accumulating and analyzing data connected with their research for several months.

11. They have been doing a lot to improve the quality of the devices lately.

12. They have been trying to solve the problem since they began to work together, but with no success.

13. The designer had been making some changes in the original project before they started to realize it.

14. The research group had been studying the properties of this substance for a long time.

15. We will have been assembling the installation for three months by the first of December.

16. He had been trying to establish business contacts with the company for a long time.

17. She has not been talking to her adviser long.

18. I have been having a lot of trouble with this equipment since I bought it.

II. Comment on the use of tenses in the following sentences and translate them into Russian.

1. Every force does its own job no matter how many other forces are acting.

2. Physicists didn't notice a discharge was taking place.

3. When we speak of management and its decisions we are really speaking of the setting of opinion or belief. This is not a process to be oversimplified.

4. Radar provides new information on meteorology and astronomy measuring winds at high levels, detecting meteors and studying cosmic rays.

5. The upsurge of electronics after the World War II gave rise to an entirely new class of computing machines expected to be employed both in industry and business.

6. The change in velocity resulted from the force which was acting from outside.

7. The scientist has studied the new kind of radiation and now we know how to detect it.

8. The application of the technique will be far more practical in future than is the case today.

9. The questions arises as to whether such primitive form really has functional significance.

10. Another ten years and you will have forgotten all about it.

11. During the past century large telescopes equipped with photographic plates have provided most of what we know about normal stars, stars whose temperatures range from 2,000 degrees kelvin, or a third the temperature of the sun.

12. Certain celestial objects radiate thousands of times more energy at infrared wavelength than the sun does at all wave length.

13. Just as the television has extended human sight across the barriers of time and distance, so the computers extend the power of the human mind across the existing barriers.

14. At first most of his colleagues didn't like his new ideas but after some extremely successful experiments he made, they saw he was right.

15. I've just read an article which is very important for the work I'm doing now.

16. The speed at which today's modern computers operate and rapid advances in data storage capacity have, over the past few years, caused something of a revolution.

17. Each excited electronic state of the atom has a characteristic life-time that indicates the average time it takes an electron to fall to a lower level and thus radiate a proton.

18. We are having some trouble with the machine we have just installed.

19. The problem has been, and is, the development of the appropriate materials and the development of the best engineering techniques for their utilization.

20. The effects produced by the small planets like the Earth and Mars are trivial, but Jupiter and Saturn modify and even radically change the orbits of comets and asteroids.

21. Communication systems have become more sophisticated and their data-transmission rate has increased.

22. Many scholars have suggested that we are indeed entering a new age whether they label it "post-industrial" or "scientific" or whatever.

III. Define the kind of the subordinate clause. Select and analyse the predicate in each sentence. Translate the sentences.

1. When they advanced their hypothesis they had no adequate tool to make it practicable.

2. His interpretation seems to be related to the analysis we have just examined.

3. What the businessman needs to know is how the new developments can be applied in industry.

4. The approach indicated above is different from what we may call the traditional approach.

5. As the X-ray method of examining inner organs is to a certain extent harmful, scientists have developed a new method of ultrasonic examination.

6. A missile which flies at 35,000 feet encounters less air resistance than a missile flying near the sea level.

7. One of the most interesting developments in this field is the great number of small firms that have begun manufacturing computers during the last few years.

8. Subsequent work has made it clear that the two factors interact giving rise to a sudden change of the whole pattern.

9. A nuclear reactor will be practical at some future time when very large long-life space vehicles come into use.

10. We define an atom as the smallest particle of an element which takes part in a chemical change.

11. Roentgen became aware of the existence of X-rays when he noticed that a fluorescent substance became luminous even through a thick layer of some material.

12. Hydraulic turbines are the machines that convert the energy of flowing water into mechanical energy.

13. Today we are finishing the job we started a year ago.

14. We are going to write an article about the experiments we have made recently.

15. When we came to the factory, the workers were still installing the new equipment.

16. When I switched on the radio, they were broadcasting a very interesting program

17. Great difficulties arose when we were applying this method to practice.

18. He found an error when he was making an additional check.

19. We obtained the desired information when we were analyzing the data.

20. We didn't know that you had already compared and discussed the results.

21. The project will never succeed if there is no understanding among the participants.

22. You will benefit a lot if you sign the contract.

23. They won't change their decision until they get more reliable information.

24. A question that has received considerable attention concerns the possibility of this mechanism.

25. That these reactions occur at such temperatures is not very surprising.

IV. Use the verbs given in brackets in proper tenses.

1. Present Indefinite or Present Continuous

1. What language they (to speak) in Holland? What language he (to speak) now?

2. The professor (to speak) five foreign languages. Right now he (to speak) Dutch.

3. My friend always (to tell) me the truth, but I see that she (to tell) a lie now.

4. She (not to understand) what the teacher (to explain).

5. I (not to recognize) the man who (to give) a talk.

6. What you (to think) about? – I (not to think) of anything, I just (to have) a rest.

7. She often (to come) to see you? – Not so often, she (to be) a student now and (to be) very busy.

8. What you (to look) at? – I (to look) at that picture over there. It (to be) beautiful.

9. Ring me up when you (to be) free. I (to have) something to discuss with you.

10. You (to understand) what they (to speak) about? – No, they (to speak) too low.

2. Future Indefinite or Present Indefinite

1. The article (not to be) very difficult. He (to translate) it tonight.

2. My friend (to leave) tomorrow. She (to say) she (to write) to me every week.

3. I think he (to make) good progress very soon because he (to work) hard.

4. We (to have) another discussion as soon as we (to receive) the final results.

5. If you (to translate) this article into Russian, I (to use) it in my report.

6. If the sun (to be) red, it is a sign that we (to have) a fine day tomorrow.

7. There (to be) some mistakes in this document. – All right. I (to type) it again.

8. We (to contact) you if we (to have) the information you are interested in.

9. Leave a note for them on the table and they (to see) it when they (to come)

10. You (to do) anything special tomorrow? – Yes, if my cousins (to come), I (to show) them round London.

3. Past Indefinite or Past Continuous

1. He (to come) in and (to see) Nelly who (to draw) a strange picture.

2. I (not to hear) what he (to say). I (to type) at the moment.

3. We (to walk) in silence for 5 minutes, then he (to speak).

4. When it (to happen)? It (to happen) when you (to talk) to your secretary.

5. Nobody (to know) what he (to think) about at that moment.

6. She (to make) good progress in French as an experienced teacher (to teach) her.

7. Paul (to walk) aimlessly up and down the room for a long time. He (not to know) what to do.

8. I (to sit) on the bench for half an hour and then (to begin) reading a book.

9. You (to see) him in the morning? – Yes, he (to stand) in the hall speaking to his colleagues.

10. While the manager (to talk) on the phone, the secretary (to get) the documents ready.

4. Past Indefinite or Present Perfect

1. He (to forget) his French since he (to leave) Paris.

2. The director (not to sign) the document yet.

3. I (to lose) my keys and (not to remember) where I (to see) them last.

4. You (to hear) from Jane lately? – Yes, I (to get) a message from her last night.

5. I (to get) a fax from Boston an hour ago, but I (not to answer) it yet.

6. You (to speak) to Ann yesterday? – No, I (not to see) her lately. I (not to remember) when I last (to see) her.

7. Where (to be) Nikolayev? Why he (not to come) to the Institute? – I (not to see) him today. I am afraid he (to fall) ill.

8. The lecture already (to begin). When it (to begin)? It (to begin) a few minutes ago.

9. I (not to see) them since we (to graduate) from the Institute.

10. You (to discuss) this problem with him, when you (to be) in Moscow?

5. Present Perfect or Present Perfect Continuous

1. They (to make) the experiment since eight o'clock in the morning. They only just (to finish).

2. Ann (to fail) her exam three times because she (to be) so bad in mathematics. But she (to practise) for a week now, I hope she'll pass it in the end.

3. Customers (to ring) up all morning complaining about getting incorrect bills. – I know. Something (to go) wrong with our computer.

4. Scientists (to study) this substance for many years. They already (to discover) some useful properties of this substance.

5. I (to try) to learn Japanese for years, but I (not to make) good progress yet.

6. He (to work) at his report since Monday. He (to begin) just to write conclusion.

7. They (to discuss) this problem for rather a long time, but (not to come) to an agreement yet.

8. How long she (to study) music? – She (to study) music since her early childhood.

9. I (to look) through the papers for more than two hours already, but I (not to find) anything interesting yet.

10. How long you (to know) each other? – Since we went to college.

6. Present Perfect or Past Perfect

1. He looked at the girl and understood he (to see) her somewhere before.

2. You ever (to see) a flying saucer?

3. Nick hoped there (to be) no post since Friday.

4. He said they (to discuss) everything.

5. We couldn't answer your fax at once. We (not to take) a final decision by that time yet.

6. We (not to see) him for ages. They say, he (to change) greatly.

7. The news that he (to leave) the town was a surprise to all of us.

8. By the time she came we (to do) the greater part of the work.

9. The secretary (to type) all the documents by the time the chief returned.

10. Mrs Brown lives next door but she never (to say) more than "good morning" to me.

7. Past Indefinite or Past Perfect

1. The teacher was a stranger to me. I never (to see) her before.

2. The house was very quiet when I (to get) home.

3. We felt happier when they (to leave).

4. She gave him the book his teacher (to recommend).

5. They (to finish) the translation by 5 o'clock.

6. She got a message saying he (to pass) the exam.

7. Margaret was late for work. Her friends (to be) very surprised. She never (to be) late before.

8. By the time we (to arrive), the discussion (to finish).

9. Before we (to take) Paul to the theatre, he never (to see) a play on the stage before.

10. He (to come) from a small town, and nobody (to hear) of him before.

V. Put the infinitives in brackets in the proper tense form. Translate the sentences.

1. We just (to finish) the analysis of the results.

2. When he entered the laboratory he (to see) that the researchers (to discuss) the results of the experiment which they just (to complete).

3. Now we (to study) the possibilities of using solar energy for practical purposes.

4. He (to look for) his notes but could not (to find) them anywhere.

5. We (to discuss) this problem for two years but still cannot (to find) the solution.

6. Their experiment (to result in) an unexpected discovery.

7. The rocket (to provide) the only practical means needed to place an artificial satellite in an orbit about the Earth.

8. After World War II complex vehicles and weapons (to be) merely assemblies of separately designed components rather than integrated systems.

9. K.E. Tsiolkovsky (to feel) sure that space flight (to be) a scientific possibility.

10. She (to read) the book ever since she (to come) from the Institute and couldn't (to tear) herself away from it.

11. The lecture followed by a demonstration of the experiment (to take place) yesterday.

12. He (to predict) the phenomenon long before its discovery.

13. I am afraid they can't (to settle) the problem you (to talk) about so soon.

14. They (to manage) to obtain the compound by the end of the month.

VI. Answer the questions paying attention to the difference in the use of Present Perfect Continuous and present Perfect.

Example: What have you been doing since two o'clock? (to write letters). I have been writing letters. But I have not written them yet.

1. What have you been doing since you came back from the Institute? (to check some data)
2. What have you been doing since morning? (to make measurements)
3. What have you been doing since I rang you up? (to repair the recorder)
4. What have you been doing since I left? (to solve some equations)
5. How long have you been gathering these data? (since I started performing the experiment)
6. Since when have you been making these observations? (last month)
7. How long have you been studying this theory? (since I started working at the laboratory)

VII. Make up all possible types of questions to the following sentences.

1. All solid bodies become breakable at temperatures close to absolute zero.
2. Scientists all over the world are looking for more efficient ways of generating electricity directly from the atomic fuel.
3. A self-controlling device operates properly in all modes of work.
4. They have introduced an automatic control system lately.
5. This information will enable the scientist to make a forecast for the next few years.
6. They have been applying a high power telescope since they began their research.
7. Different automatic pilot systems will be providing a wide variety of control during the flight.

VIII. Translate the sentences into English.

1. Каждый предмет, независимо от того, какова его температура, излучает энергию.
2. Сооружение первой экспериментальной радиолокационной станции началось в 1935 году.

3. Пластичность многих веществ возрастает при нагревании.

4. Только недавно мы оценили потенциальные возможности этой области.

5. Определенные сложности возникают при любой попытке создать лабораторные модели астрофизических систем.

6. Каждый сегодня знаком с принципами, на которых работает радар.

7. Жидкости принимают форму сосуда, содержащего их.

8. Интенсивное изучение этого явления привело к некоторым важным открытиям.

9. Выставка, открытая в нашем городе, привлекла всеобщее внимание.

10. Некоторые ученые и инженеры работают над усовершенствованием традиционных производственных процессов, другие разрабатывают новые технологии.

11. Недавно наши исследователи осуществили очень важный эксперимент, и его результаты были в полном соответствии с их более ранними исследованиями.

12. Не спеши! Лекция начнется только через полчаса.

13. Кого ты ждешь? – Я жду нашего преподавателя. Он сейчас разговаривает с деканом.

14. Она просматривала почту, когда зазвонил телефон.

15. Книга, которую он только что написал, будет определенно пользоваться успехом.

16. Все устройства, которые мы только что посмотрели на выставке, очень современны.

17. Фирма, о которой я вам только что рассказал, предлагает различные виды оборудования для легкой промышленности.

18. Я уверен, что обсуждение не займет много времени.

19. Что вы будете делать на следующей неделе? – Я буду принимать участие в конференции.

20. Вы думаете, вам потребуется много времени, чтобы закончить работу? – Я думаю, около полутора часов.

21. Он преподаватель физики. Он преподает с тех пор, как окончил университет.

22. Они получили интересные данные в ходе своего исследования.

II. The Passive Voice

Tense	Aspect			
	Simple	Continuous	Perfect	Perfect Continuous
Present	**be V_3** *am / is / are* } V_3	**be being V_3** *am / is / are* } being V_3	**have been V_3** *have / has* } been V_3	Вместо отсутствующих форм Perfect Continuous употребляются формы Perfect
Past	*was / were* } V_3	*was / were* } being V_3	had been V_3	
Future	*shall / will* } be V_3	Вместо отсутствующей формы Future Continuous употребляется форма Future Simple	*shall / will* } have been V_3	

I. Translate the sentences. Define the tense-form and the voice of the predicate.

A.

1. The apparatus is controlled in flight by a satellite programme computing device.
2. Wherever energy is expended an exact equivalent of heat is obtained.
3. Two kinds of radioactivity are distinguished: alpha-activity and beta-activity, the former is caused by emission of alpha particles and the latter by beta-particles emission.
4. The scientific and technological progress of a country is determined by the qualification of specialists.
5. The invention of the steam engine was soon followed by other useful inventions.
6. The signal was transmitted to one of the Andromeda galaxy stars.
7. The use of computers for computations was followed by their using in industry, teaching, guiding airplane flights, etc. At present electronic computers are also widely used in solving traffic problems.
8. When at rest the body will be subjected to normal pressure only.
9. The device built by Charles Babbage is now considered the parent of all modern computers.

10. The self-propelled Moon-car was equipped with scientific apparatus and instruments for research operations on the Moon at different distances from the place of landing and for controlling the operational characteristics.

11. In the atomic engine designed for providing a large thrust, heat is generated by carefully controlled atomic fissioning in a reactor.

12. Tremendous power is needed for driving a rocket or spaceship beyond the forces of the Earth's gravity.

13. If we use the old methods, a lot of time will be wasted, and very little will be achieved.

14. These devices will be exhibited next month.

15. Coaxial cables were used in long-distance common-carrier communication long before they were used in cable TV.

16. The energy of light is transformed directly into electricity in photocells. It is precisely this energy that is used to power sputniks and spaceships with electricity.

B.

1. This kind of detector is being used to give extremely informative motion picture sequences of neutron images.

2. The properties of an alloy are being determined by the properties of the elements it consists of.

3. The first "Molniya-1" satellite was launched in April, 1965 when long-range radio communication and TV systems were being established in our country.

4. Large scale computers are being designed which completely rely on transistors supposed to generate minimum heat.

5. Computers for business use will be included into this category.

6. Various alternatives of the problem are being investigated.

7. A conference on those problems is being held now.

8. The machine was being tested when we came to the factory.

9. Something important was being discussed, so I decided to listen.

10. Electricity in the form of a continuous current was being experimented by scientists.

11. In the first electric battery electricity was being released as a result of the chemical changes.

12. This investigation was being carried on for six months.

13. Power is the rate at which energy is being spent, or the rate at which work is being done.

14. Numerous improvements are being made in this device by inventors.

15. As the purpose of the investigations was to determine the structure of the crystals, a number of complicated experiments was being conducted in our laboratory last month.

16. Some disagreement was revealed when the results of two experiments were being compared.

C.

1. Complex systems of radio transmission networks have been set up throughout the world.

2. A new electron tube has been designed for generating power at microwave frequency.

3. This equation had been subjected to a considerable amount of experimental tests.

4. Once this particle has been formed, it is very stable.

5. The present telecommunications networks have been constructed independently in response to various service objectives.

6. All the machines have been tested, and the results have been written down and filed.

7. Those sources of current in which chemical action is directly responsible for the flow of electricity have been called primary batteries.

8. The earth's orbit round the sun has been carefully calculated.

9. Special measures will have been taken to provide extra-safety of the reactor.

10. Developments in atomic energy and electronics have been stimulated by the demand for new materials with improved properties and for new properties in old materials.

11. The solution of many problems had been affected by practical requirements and limitations.

12. Radio frequencies have long been considered the best means of communication across interstellar distances.

13. These data will have been obtained with the aid of computers by the end of the week.

14. A few elementary substances such as gold, silver, copper have been known since old times.

15. Up to now, thermal power has been used for driving rocket engines. This power is obtained by burning oxygen and hydrogen.

16. These questions will have been answered in a series of investigations, both experimental and theoretical by the end of the year.

II. Comment on the use of tenses and voice in the following sentences, and translate them into Russian.

1. Studies have shown that no serious modernization of the engine's assemblies will be required in order to change an engine to a new bipropellant combination.

2. The tube was designed for and will find its widest application in colour TV receivers.

3. After the mixture had been heated the chemist obtained a substance with new properties.

4. Certain materials exhibit piezoelectric properties that is when subjected to a mechanical stress they develop an electrostatic charge. This effect has been employed in many variations.

5. As carbon dioxide from burning fuels rapidly increases in the atmosphere the heat is reflected back to the earth causing the so called greenhouse effect.

6. As the quality of ceramics is steadily improved a tenfold improvement over the earlier devices was obtained.

7. The idea that this technique is almost universally accepted has been criticized in many recent papers.

8. The procedure that has been followed has many disadvantages.

9. The language of problem solution essentially describes the action to be selected when the set of initial states, the alternatives available, the results of selecting different alternative and an evaluation of the results are given.

10. Electronic devices consume very little power because they are designed with the help of transistors.

11. Actual production is influenced by a complicated environment. By studying this environment an operational research model of the factors affecting production was constructed in the shape of a mathematical formula.

12. The earth radiates longer waves which are mostly absorbed by the surrounding atmosphere.

13. When the rocket approaches the Moon new gravitational force is brought into action that of the Moon.

14. The development of automatic computers is so rapid that often new designs have become obsolete before they have even been put into practice.

15. The first scientific atom picture which really took account of a wide range of phenomena was developed by Niels Bohr about 1913.

16. Nearly all gas engines are driven by explosions which take place within the cylinder of the engine.

17. When a current is sent through the wire which is too thin to carry it freely, then more electric energy will be converted into heat than in the case of a thick wire conducting a small current.

18. When the distorting force is removed certain substances return more or less completely to the original form or size.

19. The old machine will be used until a certain point when it becomes uneconomic to operate, and a new machine is to be installed.

20. Some laboratory experiments have been performed which exhibit the same physical effects as those important in cosmic electrodynamics.

21. The lack of electrical charge makes it impossible to detect neutrons in the same way protons and electrons are detected.

22. Several schemes for controlling machine-tools from the output of a digital computer have been, and are being developed in various parts of the world.

23. The size of microelectronic circuits has decreased to the point where their surface dimensions are measured in microns (thousandths of a millimeter) and their thickness in angstroms (tenmillionths of a millimeter).

24. Very few substances have the same freezing or boiling point and therefore these criteria are often used for analysis.

25. When sufficient altitude is reached the vertical take-off airplane levels off and flies as an ordinary airplane and the wing provides supporting lift.

26. Machine parts are often X-rayed to make sure that they are really suitable for the job they have been constructed for.

III. Use the verbs given in brackets in the proper tense and voice forms.

1. The mail (to bring) usually at 9 in the morning.
2. The experiment (to describe) in several journals next month.
3. Each piece of equipment (to test) very carefully.
4. The meeting (to put off), because the day (not to be) convenient for most of the people.

5. This consideration (to confirm) both by theory and by experiment.

6. At present computers (to use) more widely in the sphere of education.

7. Unique gas deposits (to find) in the northern part of that region.

8. Many new enterprises (to establish) in this area now.

9. Some hydrodynamic and electromagnetic phenomena (to describe) most simply in terms of waves.

10. Such substances (to use) successfully as the main elements both for various measuring instruments and automatic devices.

11. The act of transmitting a signal from one frequency band to another (to call) modulation.

12. These results (to obtain) by the joint efforts of many researchers lately.

13. The new spaceship (to launch) in Florida in some days.

14. Due to the instruments available the measurements (to make) quite accurately.

15. This fact (not to mention) in his last speech.

16. My project paper (to publish) next week.

IV. Change the form of the verbs in the sentences from the active into the passive voice.

Model: 1) Newton advanced the corpuscular theory of light.
The corpuscular theory of light was advanced by Newton.
2) The students have translated the article without mistakes.
The article has been translated by the students without mistakes.

1. We keep all the documents in perfect order.

2. They will solve the problem in the near future.

3. During testing of the new model the group used the most modern methods of control.

4. Scientists and engineers are developing new types of electronic and cybernetic devices.

5. They have just tested these machines.

6. Planck first proposed the quantum theory in 1901.

7. They will apply the new method as soon as they get new equipment.

8. He did not follow your pattern.

9. Scientists are using new types of devices in this experiment.

10. Christian Huyghens put forward the wave theory of light.

11. They will test this material until they obtain all the necessary data.

12. We have not settled the matter yet.

13. They charged the body negatively.

14. She is interviewing the participants of the conference.

15. They have made great progress in this field.

16. Everybody knows the difference between the three states of matter.

V. Change the form of the verbs in the sentences from the passive into the active voice.

Model: 1) His work was finished in time.
He finished the work in time.
2) This mistake will not be repeated by us in future.
We won't repeat this mistake in future.

1. We are provided with atomic energy by the nucleus.
2. Electron was discovered by J.J. Thomson in 1897.
3. The effects of electricity were studied by many physicists.
4. The first electric battery was built by Alessandro Volta in 1800.
5. X-rays are being generated by cathode rays.
6. Precautions have been taken to dry the surface of the specimen.
7. The negative charge is carried by an electron.
8. The body will be heated enough by electricity.
9. The acceleration of a falling object is affected by air resistance.
10. The discovery of the double nature of electrons was followed by a change in the quantum theory.
11. X-ray examination and neutron radiography will be applied in their experiment.
12. The deflection of X-rays was being observed by the researchers both in a magnetic and in an electric field.
13. After the reliability of the new method had been proved, it was commonly accepted by the scientists.
14. The availability of cheap water power in this place was much spoken about.

15. The position of a planet beyond the range of human vision has been predicted by mathematical analysis.

16. The experiments on electricity were carries out by Benjamin Franklin in 1746.

VI. Translate the sentences paying attention to the modal verbs or their equivalents in the structure of the predicate.

1. If living standards are to be improved ways must be found to increase production.

2. The invention is not limited to the exact forms of setscrew illustrated in the accompanying drawings and specification, various changes in the detail of construction may be resorted to by those skilled in the art without departure from the scope of the invention.

3. The article published in the latest journal should be used in your research.

4. When the telescope system is in orbit reliable remote control from the ground must be provided.

5. Since the computer has become a common business tool the information can be stored in electronic memories and got out by pressing a button.

6. The approach that has been developed here may be considered as an extension of the methods using enumeration.

7. An optimization model has to take into account costs or selling prices which are at least partially determined by the economic environment. The same environment dictates most of the constraints to be encountered.

8. By the use of this method a particular solution may readily be obtained and it is this type of work that has been greatly aided by electronic machines.

9. Each metal possesses certain distinct combinations of properties that may be varied for specific applications by alloying it with relatively small amounts of other metals.

10. In this case mathematical methods have to be employed rather than graphical ones.

11. Great forces appearing due to expansion and contraction of solids should be taken into consideration in engineering.

12. If the system is to produce these characteristics, the error must be reduced to zero.

13. Thanks to the reliability of modern computing devices space flights can be accomplished successfully.

14. Many problems had to be solved: the main one was "breaking" the released neutrons efficiently so that the chain reaction could be controlled.

15. Calculations show that exceptionally small-sized generators and transformers can be developed with an efficiency of 99.99 per cent.

16. The principle involved in the construction of the electron microscope is that a stream of electrons can be deflected by a magnetic field.

17. A copper wire acting as a conductor in ordinary dynamos can be successfully replaced by a jet of gas heated to a plasma state.

18. The efficiency of transforming the energy of fuel heat into electric current in a plasma generator can be brought even to 70 per cent.

19. It is proper to note that a basic distinction between gases, liquids, and solids can be made by considering the rigidity of the substance.

20. Problems of navigation are much more complex in space. So the velocity of the rocket and the velocity of the Earth and any planet it is trying to approach must be taken into consideration.

21. The chemical make-up of a star can be determined by the light it emits.

22. When the chamber is properly designed and the voltage properly adjusted the bursts of current may be magnified sufficiently by this process.

23. This process may be recorded electronographically, converted to a television picture signal or made visible on a phosphor screen from which it can be photographed.

24. Such metal can quickly and easily be traced and measured because of its radioactivity.

25. During such experiments interfering influences must be excluded and an artificial environment be created in which the contribution of the individual components can be taken account of.

26. One of these devices is particularly convenient in the data are to be processed by means of an electronic computer without any intermediate transcription involving a possible risk of errors.

27. The more a material is affected by corrosion, the more care must be taken to prevent it by adequate coating if good fatigue characteristics are to be maintained.

VII. Read the passages. Select the predicates in the passive voice.

1. What are the Reasons?

Many great cities of the world were built hundreds of years ago. During their long history some of them were destroyed several times for one reason or another, and then rebuilt.

London, for instance, was burnt down in the Great Fire of 1666.

When Napoleon's army entered Moscow in 1812, the city was nearly empty and in flames. Most of the houses were soon destroyed by the fire, and many were badly damaged.

A lot of beautiful cities were left in ruins after the World Wars.

Serious damage is done to cities and villages by floods, hurricanes and earthquakes and still more by wars and industrial pollution.

2. Market economies are directed by prices. As the price of an item rises, sellers are encouraged to increase production, and consumers discouraged from purchasing the item. When the price falls, the opposite is true. In this way prices send out "signals" to buyers and sellers, thereby keeping the economy responsive to the forces of supply and demand.

In a free market economy prices are determined by the interaction of the forces of supply and demand. Perfectly competitive markets are those in which many buyers and sellers with full knowledge of market conditions, buy and sell products that are identical to one another.

Supply, which is the quantity of goods or services that sellers would offer for sale at all possible prices at a particular time and place, varies directly with price. In other words, at a higher price more goods and services will be offered for sale than at lower one and vice versa.

Demand is the quantity of goods or services that buyers would take at all possible prices. Demand varies inversely with price. That is at a higher price fewer items would be bought than at a lower one. The degree to which price changes affect demand will depend upon the elasticity of demand for a particular item.

The price, at which goods and services actually change hands is known as the equilibrium, or market price. It occurs at that point at which the quantity demanded exactly equals the quantity supplied. Market price can be represented graphically at the point of intersection of the supply and demand curves.

Shifts in demand or supply will affect market price. When everything else is held constant, an increase in demand will result in an increase in

market price, and vice versa. Similarly, an increase in supply will result in a decrease in price, and vice versa.

VIII. Translate the sentences into English.

1. После того, как стало ясно, что в вычислении сделана ошибка, эксперимент был прекращен.

2. Мне рекомендовали несколько статей по этой проблеме.

3. Сила, необходимая для того, чтобы преодолеть сопротивление и инерцию, создается силовой установкой.

4. Новые данные, полученные в последнем эксперименте, обсуждаются сейчас исследователями.

5. Были предприняты меры, для того чтобы увеличить скорость установки.

6. Компрессоры используются для получения сильно сжатого газа.

7. При производстве товаров особое внимание следует уделять их качеству.

8. На этот раз все наблюдения были сделаны с помощью самого большого в мире телескопа.

9. Ломоносова можно назвать основоположником высшего образования в России.

10. После того, как была разработана новая технология, результаты значительно улучшились.

11. Тела и частицы приводятся в движение, когда на них действует сила.

12. Многочисленные изобретения были сделаны человеком для увеличения диапазона радио и телевизионных передач.

13. Статья должна быть переведена как можно быстрее, т.к. очень важная информация содержится в ней.

14. Результаты их эксперимента будут опубликованы и прокомментированы в следующем номере журнала.

15. Основная тенденция нашей жизни заключается в том, что компьютеры сейчас используются во всех областях технологии, науки и повседневной жизни.

16. Самые современные методы исследования применяются сейчас в нашей лаборатории.

17. Этот вопрос будут обсуждать на следующей неделе.

18. Ему дали все необходимые инструкции, прежде чем он начал эксперимент.

19. Эта статья интересная и на нее часто ссылаются.

20. Свойства этого элемента будут описаны детально.

21. Конференция была посвящена предмету, который изучался ими на протяжении двух лет.

22. Их попросили сделать химический анализ этих соединений.

23. К тому времени, когда эти данные были получены, наши эксперименты были завершены.

24. Ему еще не показали оборудование, которое будет использоваться в эксперименте.

25. Интенсивность света была измерена с большой точностью.

III. Revision Exercises on Tense and Voice

I. Define the tense and voice form of the predicate in the following sentences and translate them into Russian.

1. The calculations of the aerodynamic performance showed that the engine is able to operate when its units are cooled by radiation if a surface has a certain value of emission. This is achieved by coating the air intake's body and the external body's cone with a special heat-resistant highly emissive layer.

2. Since a spacecraft is designed for a mission to Mars we are waiting for the next favourable opportunity when Mars makes its close approach to Earth.

3. The analyst knows, in general, the range of conditions he must test, the nature of the results he is expecting, and the type of action he will take when he evaluates intermediate results.

4. Marketing directs the flow of goods and services from producers to consumers. The principal elements of marketing are summarized in the "four Ps" of Product, Price, Place and Promotion.

5. In search for improved reaction rates and new chemicals, engineers are turning to plasmas. Plasma chemistry has a long way to go before it makes a real impact on the chemical industry but it is slowly moving from the laboratory into the production plant.

6. Mathematical forecasting techniques ensure that the data are used in the best manner. The importance of this technique to commerce and

industry is self-evident. It is essential that industry should have every assistance it can possibly obtain from science.

7. Science along with its spectacular developments in electronic fields has perfected the principles that promise to usher in the second part of the industrial revolution based on machines that correct their own mistakes, carry on complex repetitive tasks with as much- and sometimes more – skill, common sense, and precision as any human. These new machines can solve many of the human problems which the first industrial revolution has caused.

8. A current-carrying wire will almost always be at a higher temperature than the temperature of the same wire when a current is not flowing through it.

9. Combining many of the most important technological developments of the last decades, the computers embody the new technology of control in its highest form.

10. Never we have witnessed such a rapid progress as in the post-war electronics.

11. On April 12, 1961 in the USSR the world's first satellite spaceship "Vostok" with a man on board was put into orbit round the Earth.

12. When the first space flights were made by Gagarine and Titov radio electronics was extensively used for trajectory measurements, for the transmission of radiotelemetric data and for radio communication with the earth.

13. Steam-driven bicycle was built using a steam engine. Although earlier steam-driven road vehicles had proved too heavy and cumbersome, the technology of the lightweight bicycle seemed at that time to offer new possibilities.

14. If proved experimentally the new concept is commonly adopted as a basis for further investigations.

15. The study of different substances at low temperatures has revealed many interesting phenomena. One of the most amazing was superconductivity – the complete loss of resistance to electrical current. This property has been found in more than 20 metals. If an electric current is sent through a ring of cooled metal of this type, it will circulate for a very long time.

16. Many people believe that it was a sad day indeed when Rutherford split the atom; other people believe that if it had not been Rutherford, it would have been someone else.

17. When we speak about the further development of computers we mean not only quantity but also high technology and high speed.

18. The Copernical revolution entailed a fundamental change in man's world view from an earth-centered planetary system to a sun-centered one and led to the development of modern astronomy and the exploration of space.

19. The most difficult problem that the Wright brothers encountered, and the last they surmounted, was the achievement of satisfactory flying qualities.

20. Early uses of digital computers were on military problems and from this had developed the present-day large volume of scientific calculations which have even greater civilian uses such as the new techniques we call operational research.

21. By a complex of theoretical assumptions, arguments by analogy and experimental determination the atomic weights of many of the chemical elements were established.

22. This field of research now has the potential to exert a deep influence on the way computer programs are produced.

23. The laws of thermodynamics which are in no sense the property of chemists, have been most helpful in developing physical chemistry, but they could not have given this help to the extent that they have without accurate experimental data of the most varied kind.

24. The first electronic computer, the Eniac, was completed soon after the end of the war. This however, was not the true forerunner of modern computers.

25. The giant planets beyond the asteroid belt, that is to say Jupiter, Saturn, Uranus and Neptune are each surrounded by a number of satellite bodies, in some cases forming what might be termed replicas of the solar system in miniature.

26. A plane crash is explained as a result of engine failure coupled with pilot error.

27. In the design of new systems, new devices and new materials for high temperatures a substantial body of information on material properties will be required.

28. The most important of laser's advantages, their tremendous speed of action, was discovered a few years ago. This advantage has been applied in many devices.

29. Although the possibilities of artificial earth satellites were recognized immediately after World War II, it was not until the mid-1950's that

the future availability of rockets was assured and satellite program actually initiated.

30. In 1903 K.E.Tsiolkovsky described a streamlined rocket-driven vehicle for space travel which used liquid oxygen and hydrogen as propellants.

31. The pressurized liquid-propellant power plant has been used for rocket-assisted take-off power plants for aircraft.

32. His results generated wide interest since the pulses of gravitational radiation he was detecting implied the occurrence of cataclysmic events in the center of the galaxy. Several groups of workers around the world undertook similar efforts.

33. Our epoch is an epoch of scientific and technological revolution, when new ideas are being born and new discoveries and inventions are being made at an ever increasing rate.

34. Rockets will be the main means of travelling in space. There are various different kinds of rocket engines, but the traditional chemical rocket engine in which a fuel and an oxidizer are mixed and the hot gases produced are ejected in the opposite direction to the direction of travel will be the "work-horse" of life in space, like motor-car engines on Earth.

35. Rapidly evolving commercial products and processes are already transforming the way aircraft are designed and manufactured, and they promise to change aerospace vehicles beyond recognition.

36. New developments in science create new problems and are also affected by, and have an impact on, man's social environment. Our culture, economy, and society have already been modified in dramatic ways by these impacts and the coming years will see vastly greater effects.

37. No matter how many observations are performed, there will always be alternative hypotheses which can account for them.

38. Real progress in robot making began in the late 18^{th} and early 19^{th} centuries. It was called the "Industrial Revolution" because the invention of new kinds of machinery caused a sudden change in ways of making things. Better ways of controlling machines were needed, so men began inventing robots.

39. It is the fiber composites that have evoked the greatest interest and development effort in the past years. There are a number of reasons for this. The most important is that thin fibers seem to offer the most promising approach for exploiting the ultrahigh strengths inherent in structural materials. Moreover, materials that are normally stiff and brittle

achieve their maximum flexibility when produced in the form of thin fibers.

40. When a fast cosmic ray particle strikes the nucleus of an atom in a meteorite, it typically ejects several neutrons and protons together with some of the pi-mesons representing the attractive forces the hold the nucleus together. The remainder of the energy of the bombarding particle is shared among the neutrons and protons left behind in the nucleus. One or more of these particles may subsequently "evaporate" out of the nucleus. The end result of this is that the struck nucleus is transformed into a nucleus of a different element, which may be either radioactive or stable. A meteorite that has been exposed to cosmic radiation as it orbited in space will contain minute amounts of radioactive elements, which can be identified by their half-lives and by the characteristic radiation they emit.

II. Translate the sentences into English.

1. Мой брат работает в исследовательском институте. Он работает там уже 5 лет. В настоящее время он работает над своей диссертацией, которая касается теоретических проблем. Он работает над диссертацией уже год. Сейчас он проводит экспериментальную работу в области метрологии в одной из лабораторий института.

2. Она приехала в наш город три года назад. К тому времени она уже окончила институт.

3. Что ты будешь делать завтра в это время? – Я буду просматривать новые газеты и журналы.

4. Я переводила статью уже час, когда вы пришли ко мне.

5. Я думаю, что они закончат свое исследование к концу года, и результаты будут опубликованы.

6. Данные будут собраны одновременно, оценены и по завершении эксперимента представлены в форме доклада.

7. Вы написали свой доклад? Как долго вы работает над ним? – Я пишу его с прошлого вторника. Надеюсь, что к следующей субботе я его закончу.

8. Переговоры все еще ведутся? – Как сообщается в печати, они подходят к концу. Но соглашение еще не достигнуто до сих пор.

9. Он всегда интересовался физикой. Сейчас он работает над новой проблемой. Он работает над ней уже три месяца.

10. С вами что-то случилось? Вы так бледны. – Ничего особенного. Я только что закончил работу и немного устал.

11. Вчера он был занят весь вечер, он ремонтировал телевизор.

12. Вчера мне показали журнал, в котором была опубликована статья, написанная известным физиком.

13. Я уверена, что вам зададут много вопросов, когда вы будете рассказывать о своей поездке.

14. Эта работа была написана до того, как были сделаны новые открытия в этой области.

15. Аэропорт был закрыт, так как целую неделю шел сильный снег.

16. Я просмотрела большое количество журналов, но не нашла статью, которая меня интересует.

17. Цена этой машины немного выше цен других моделей, но ее качество гораздо выше. Это фактически самая лучшая модель, которую мы сделали за последние несколько лет. Конструкция современна, машина надежна и легка в эксплуатации.

18. Этот эксперимент отнял слишком много времени и не дал никаких результатов.

19. Сравнение результатов показало, что они были получена при использовании различных экспериментальных технологий.

20. Вопрос все еще обсуждался, когда он пришел.

21. Вы были недостаточно внимательны, когда устанавливали машину, поэтому она вышла из строя.

22. Интервью с известным ученым было показано по телевидению на прошлой неделе. Он рассказывал о принципиально новом типе электронных устройств, разработанном им в последнее время.

III. Translate the dialogues into English and dramatize them.

1.

A. Позвольте спросить, что это за коробочка у вас на поясе?

B. Это электронный прибор. Мы называем его бипер (a Beeper).

A. Каково назначение этого устройства?

B. По существу, это небольшой радиоприемник, который издает сигналы (to beep) или, в более сложных моделях, передает голосовое сообщение (a voice message) от передающей станции. И его задача – сообщить владельцу, что кто-то вызывает его.

A. Владелец этого сигнального устройства, вероятно, хорошо знает, что он должен делать, получив сигнал вызова?

В. Конечно. Он должен пойти к месту, где расположен передатчик или сделать запрос (an inquiry) по телефону.

А. Кому выдаются такие биперы?

В. Бóльшая часть владельцев биперов – врачи и другой медицинский персонал, но также они используются журналистами, полицейскими, официантами в некоторых больших ресторанах.

А. Какова дальность действия устройства?

В. Обычная дальность действия бипера – 20 миль, но некоторые компании располагают сетью передатчиков, обеспечивающих бóльшую дальность действия.

2.

А. Не могли бы Вы сказать несколько слов о магнитно-тепловом двигателе (the magneto-heat engine), разработанном Вашей лабораторией? Что он собой представляет?

В. Изобретение относится к устройствам, преобразующим тепловую энергию, например, энергию солнечных лучей, в механическую энергию.

А. Существуют ли какие-либо промежуточные преобразования энергии?

В. Никаких. Это принципиально новый двигатель. Известно, что некоторые металлы и их сплавы притягиваются магнитом. Но если их нагреть, то они это свойство теряют. Именно на этом принципе и построен новый двигатель.

А. Как он работает?

В. Ротор сделан из сплава, теряющего свои магнитные свойства уже при 100°С. Если этот ротор со стороны, обращенной к магниту, нагреть, то его холодная сторона повернется к магниту. Там она нагревается, а другая сторона остывает и затем тоже повернется к магниту и т.д.

А. Какой источник тепла используется здесь?

В. Для нагрева используются сфокусированные на роторе лучи солнца.

А. Где такой двигатель найдет применение?

В. Он может приводить в движение насосы, применяться в различного рода датчиках, а также и в автоматических устройствах.

А. Каковы преимущества двигателя?

В. Солнечная энергия дешевая, а двигатель не причиняет вреда окружающей среде.

Modal Verbs

Modal Verbs and their Equivalents

Modal verbs and their equivalents	Meaning	Tense		
		Present	Past	Future
can – to be able to	I. Могу, можно, умею. Физическая или умственная возможность (способность). Возможность, обусловленная внешними обстоятельствами. Разрешение. II. Неужели, не может быть (в вопросительных и отрицательных предложениях) Удивление, сомнение.	can	could	-
		am / is / are } able to	*was / were* } able to	*shall / will* } be able to
may – to be allowed to	I. Могу, можно. Разрешение осуществить действие. II. Возможно, может быть. Возможность, слабое предположение	may	might	-
		am / is / are } allowed to	*was / were* } allowed to	*shall / will* } be allowed to
must – to have to	I. Должен, надо, нужно Долженствование, необходимость, приказ, совет II. Вероятно, очевидно, должно быть Предположение, вероятность совершения действия	must	-	-
		have to has to	had to	*shall / will* } have to
to be to	Должен Необходимость, обусловленная заранее намеченным планом, договоренностью, расписанием	*am / is / are* } to	*was / were* } to	

Should	Должен, должен бы, следует, следовало бы	should		
ought to	Должен (бы), следует, следовало бы Моральный долг или совет	ought to		
Need	Необходимо, нужно Необходимость совершения действия (в отрицат. и вопросит. предложениях)	need	needed	*shall* / *will* } need

I. Comment on the use and meaning of the modal verbs and their equivalents. Translate the sentences.

1. A well-trained designer can foresee many faults in the system.
2. We must develop fully automated equipment to provide much lower costs of aircraft service.
3. In the selection of a suitable power unit we must take into consideration also simplicity and convenience.
4. The lift-generating system of VTOL aircraft should be powerful.
5. Examining the cold engine from top to bottom he could find the leak.
6. Many experts can't decide whether so much TV is harmful to the individual's health and mental activity or not.
7. You must do your best to radically improve the device.
8. Airplanes and helicopters can become highly electrically charged either from flying through dust or snow or from encountering strong electric fields in clouds.
9. All nations have to make fundamental changes in their economic, political and technological institutions if they are to preserve the environment.
10. Helicopters can rise or descend vertically, hover, and more forward, backward, or laterally.
11. If we are to employ this technique, we ought to update our equipment.

12. To predict where a body will be we must know how close it can approach one of the planets and what happens when it does.

13. Anything that may occur with or on the Sun will not affect the Earth or its motion until 8 minutes later.

14. We should remember this rather obvious point when conclusions are drawn from the laboratory experiments alone.

15. The application of the method may result in the following formula.

16. After the model had been tested we could recommend it for mass production.

17. I think you should have a preliminary exchange of opinions.

18. According to the traffic regulations in England one is to keep to the left while driving a car.

19. It has been found that organic molecules may be responsible for the dark areas on Mars.

20. In the field of radio-astronomy we are able to consider the possibilities of our receiving signals from the universe.

21. You should neither overestimate nor underestimate the phenomenon.

22. Optical means of astronomical observations cannot detect the traces of societies over such great distances, but the development of radio astronomy may offer better opportunities.

23. A system consisting of three satellites was able to ensure the reception of TV programmes.

24. If we want to achieve something in life, we must follow this rule: Never put off till tomorrow what you can do today.

25. No society can assure effective conditions for scientific development unless it possesses special institutions dedicated to the transmission of knowledge and to the training of individuals to become searchers after new knowledge.

26. Vibration doesn't only causes noise, but can destroy materials and structures as well.

27. Communication can take place only between people with a common aim, a common interest who are able to get each other to understand what they have to say.

28. They were not allowed to use these instruments in their experiment.

29. Since heat is not a substance but a form of energy we cannot measure it directly in pounds or litres but must measure it by the effect it can produce.

30. Man will have to create a new combustion material that will serve as the fuel for distant interplanetary travel.

II. Define the voice of the predicate in the following sentences and translate them.

1. Apart from the fact that this equipment is designed for the computer age and it may be operated with modern computer systems, it can be changed rapidly from one test to another.

2. It is generally accepted that imperfections in crystal planes of metal, especially those known as dislocations, may be revealed by electron microscopes of high resolution.

3. Even in the most complex experimental project every group must be matched by its binary, from which it differs in one respect only. To accomplish this we must carefully analyze all observations and define their basic constituents.

4. Human product can be rated as acceptable or unacceptable, fruitful or misguided, can be approved of or judged inadequate.

5. Since gamma-rays do not have to be connected to a source of electric power to be operated, as X-ray machines do, they can be used almost anywhere.

6. The businessman is quite aware that, however small and cheap the new mechanisms may become, there is much that must be changed in his plant before electronic circuits are going to make automatic production possible.

7. The experiments with biological electricity may lead to the development of body-powered devices which could be implanted into humans together with tiny transmitters.

8. The safety of personnel engaged in gamma-inspection of articles are to be ensured by the construction of protection devices, the reduction of exposure time and by increasing the distance between gamma-sources and attending personnel.

9. The report should contain conclusions but usually should not contain recommendations. It should be designed to serve as a basis for decision but should not itself make the decision.

10. The system as a whole cannot be considered as a purely mechanical one with single responses to specific situations.

11. If the resulting voltage differs from the required voltage value, the section lengths must be changed and the calculation performed again.

12. The metal-oxide-semiconductor fabrication technique can put more than 10,000 electronic components on a silicon chip only a few millimeters across. Its economic impact can be seen in such devices as pocket calculators.

13. Several factors should be considered when the experimental results are evaluated.

14. After charged particles have been accelerated they can be used for nuclear experiments.

15. These values are to be compared with the previously reported ones.

16. The process can be easily simulated in laboratory, no matter how peculiar its mechanism may seem to a non-specialist.

17. A pound of excessive weight for a satellite may lead to a complete failure.

18. Much will have to be done to improve laboratory methods.

19. Every radio and navigational facilities should be used by a pilot flying under condition of unknown wind direction or force to determine accurately his position.

III. Change the following sentences from Active into Passive.

1. We must discuss the matter not later than tomorrow.
2. Nobody can do it without your help.
3. May I take the books and papers away?
4. A microscope can reveal vastly more detail than is visible to the naked eye.
5. In this device we can use a plurality of electrodes separated by and in contact with a dielectric material.
6. This finding means that we should not reject this hypothesis.
7. The electronic stop-watch can show time intervals with an accuracy of several microseconds.
8. One must know the main properties of the substance before starting the experiment.

9. We must well co-ordinate all the measures to implement the programme successfully.

10. Newton's corpuscular theory could not explain the interference of light.

11. The wave theory can explain very well the interference of light.

12. Experiments can test the validity of a theory.

13. If one receives wrong results one must repeat the experiment.

14. People may achieve solution of ecological problems only by joint efforts of all countries.

IV. Identify the modal verbs followed by perfect and non-perfect infinitive and translate the sentences.

1. The Moon, with its soft surface like damp sand, might have been designed for descending spacecraft.

2. Under such an assumption they ought to have arrived at completely different conclusions.

3. With our present-day technology such phenomena could not have been observed in the laboratory.

4. His idea was that these cosmic objects should have originated under such harsh conditions that no analogy might be valid.

5. He couldn't have done it all by himself. Somebody helped him.

6. They may not have come back yet. Let's ring them up and find out.

7. Judging from the books and papers on his writing-table he must have been working for several hours.

8. This model night have seemed ideal for safety considerations.

9. He must have no experience in translating technical articles from English into Russian.

10. There must be a mistake in the subtraction exercise, check up the difference by addition. You should have added the numbers rather than subtracted them.

11. Consequently, a general connection must have been established between the two values.

12. You ought to have compared your chances before taking a decision.

13. Many practical difficulties must have been encountered in the implementation of this idea.

14. These analyses must have been preceded by studies of physical parameters of the model.

15. This rather important assumption may have been made in the course of numerous applicability tests.

16. After this failure their investigation must have taken another course.

17. This explanation cannot have been adequate under the circumstances.

18. This approach may have been unpractical because many ideas seemed hazy and doubtful.

19. A discussion of the problem of elasticity should, logically speaking, have preceded the work on vibrations.

20. The complex path over which the signal travels must be maintained and not broken into other signals.

21. Failure to distinguish between kinetic flexibility and equilibrium flexibility may account for a number of the contradictory statements.

22. Without Kepler's laws of planetary orbits as a guide, Newton might have never proposed his law of universal gravitation.

23. Exact science in its generally accepted sense may be referred to as a family of specialized natural sciences, and each of them provides evidence and information about the different aspects by somewhat different working methods.

24. Science-fiction writers predicted generally, that space flights could be achieved around 1975, and that we might land on the Moon or travel to Mars around the turn of the century.

V. State the function of the verbs "to be" and "to have". Translate the sentences and define if these are used as a) modal verbs; b) auxiliary verbs; c) notional verbs; d) a link-verb.

1. Special training is required to handle the device.

2. X-rays are electromagnetic radiation which is weakened by interaction with the outer clouds of electrons orbiting the atomic nucleus. The heavier the element (the higher the atomic number) the denser is the atomic cloud, and the harder it is for X-rays to penetrate.

3. It should be realized that some of the strategies we have derived contain learning processes which may occur at two different levels.

4. The simplest materials are those which have only one kind of atoms.

5. The careful selection of metals and increased accuracy of voltage measuring instruments has made it possible to increase the range of the thermocouple to embrace very low temperatures.

6. A physicist has discovered that a light or an electromagnetic ray, focussed in a certain way, can cover tremendous distances without losing its power capacity.

7. It is to be noted that the electron-volt is a convenient and appropriable unit throughout atomic and nuclear physics, since we are frequently concerned with and individual electron or positive ion.

8. In company with other new instruments the scanning electron microscope has given rise to many new research procedures.

9. As a starting material for chemical synthesis on an industrial or a laboratory scale, silicon has some advantages that are unmatched.

10. One additional reason for carrying out the calculation was to test this method on a class of compounds different from those for which it was devised.

11. Many material properties such as length, pressure, electrical resistance and colour are observed to change as they become "hotter" or "colder". Any of these might be taken as the basis for a temperature scale.

12. Temperatures above 2000°C are now of real concern to design engineers.

13. A bipropellant gaseous system has certain advantages – ease of handling the propellants and ease of burning the two gases efficiently.

14. If Mars had the same original composition as the Earth, one would expect it to heat up more slowly because it has only a tenth of the mass of the Earth.

15. Experiments for industrial production of materials in space are being carried out in many countries.

16. The quality of these metal parts is to be very high.

17. It was found that the acceleration rate on board such vehicles was to be reduced to a minimum.

18. To eliminate systematic error one has to take into account all these factors.

19. At present scientists and engineers are designing spacecrafts which are to operate for months and years in the outer cosmos under very severe conditions.

20. You have to look through all resent papers, or you will not be well informed on the subject.

21. When one considers how iong the wheel has served in transportation (more than 5,000 years), it seems odd that the first really effective self-propelled wheeled vehicle was developed only 100 years ago.

22. After the error in the calculation had been noticed we had to check the results.

23. To make this device more efficient we had to substitute some of its parts.

24. A great deal of attention has been devoted to the problems generated by the "information explosion" as it has been popularly identified.

25. Since the jet engine is a powerful source of energy it is widely used for machines flying at supersonic speed.

26. The performance characteristics of aircraft have a direct influence on the runway length.

27. You'll have to convince them that the changes are absolutely necessary.

28. The human brain is being highly assisted in many spheres of research by the electronic brain. Yet, even the most perfect machine may never be able to follow the human being along his creative path. The service of the electronic brain is limited by the working out of the programme, that is the "formulating of the question". The electronic brain is able to solve problems in a remarkably shorter space of time and to carry out the work for a considerably larger period than would be possible for a man. But the preparing of a programme takes time, usually much longer than the calculation itself. This proves to be so complicated that whole armies of technicians, engineers and mathematicians are for hours, weeks and even months solely occupied with the making of the problem "ready for the machine".

29. Digital computers can be utilized in any process connected with counting or what is known as "logical analysis".

30. Analog computer are utilized for solving particular problems, such as solution of differential equations.

VI. Fill in the blanks with the appropriate modal verb.

1. She felt she ... not stand much more of this discussion. She said she ... go on with her work and began to rise.
2. We ... not hurry. The lecture ... to begin in half an hour.
3. He ... tell me the answer but he refused.
4. She has a university education and ... make a career for herself.
5. I made a few mistakes, so I ... do the whole exercise again.
6. One ... never know what ... happen.
7. If we ... to survive as a species all countries ... join their efforts in handling the problem of environment.
8. This suggestion implies that galaxies ... have formed when conditions in the universe were much more different from those now prevailing.
9. Energy ... be classified into mechanical, heat and chemical kinds of energy.
10. Water ... exist as liquid, steam or ice.

VII. Translate the sentences into English using modal verbs.

1. Можно мне поговорить с вами сейчас или я должна прийти завтра? – Мы можем поговорить сейчас. У меня есть немного свободного времени.
2. Они, должно быть, работают в лаборатории. Не следует им мешать.
3. Нам придется повторить эксперимент, который мы провели в конце прошлого месяца, потому что он был тогда неудачным.
4. Вам следует прочесть эту книгу. Она вам должна понравиться.
5. Когда мы обсуждали вчера мое сообщение, вы задали мне вопрос, на который я не смог ответить сразу. Сейчас я готов дать вам ответ.
6. Вам следовало бы заменить неисправную часть машины.

7. Что-то случилось с телевизором. Его необходимо отремонтировать.

8. Я не могу обсудить эту проблему с вами сейчас. Я должен сначала прочитать статью.

9. Эти материалы можно использовать в ряде отраслей промышленности.

10. Мы должны установить новое оборудование на следующей неделе.

11. Исследование необходимо закончить в срок.

12. Вес этого вещества нужно вычислить очень точно.

13. Мы сможет обсудить все вопросы, как только он вернется из командировки.

14. Нам придется проанализировать все предыдущие результаты, прежде чем мы приступим к новой серии испытаний.

15. Он опытный конструктор, на его совет можно положиться.

16. Я думаю, что они не смогут работать с этим оборудованием без специальных инструкций.

17. Мы сможем увидеть все самое новейшее в области электронных игр на последней выставке.

18. Я выполнил бóльшую часть работы, а остальное должно быть сделано тобой.

19. Документы невозможно подготовить так быстро. Вам придется подождать.

20. Он, возможно, не знает всех деталей, но основная идея ему ясна.

21. Компьютеры сегодня могут широко использоваться в исследовании космического пространства.

22. Вам надо бы проконсультироваться с кем-нибудь еще по этому вопросу.

23. Ему следует быть очень осторожным при проведении этого эксперимента.

24. Вам следовало бы усовершенствовать конструкцию до начала испытаний.

The Subjunctive Mood
(Сослагательное наклонение)

Сослагательное наклонение – это форма глагола-сказуемого, выражающая действие не реальное, а предполагаемое, условное или желаемое.

Сослагательное наклонение выражается:

1) синтетическими формами: **be, were, have, know** и т.д. (одинаковая для всех лиц);

2) аналитическими формами **should, would, could, might + простой инфинитив** без частицы **to,** если высказывание относится к настоящему или будущему времени или **should, would, could, might + перфектный инфинитив** без частицы **to,** если высказывание относится к предшествующему периоду.

Сослагательное наклонение употребляется:

1) В главном предложении или простом предложении, когда подразумевается, что действие могло бы произойти при определенных условиях:

e.g. An object that weighs 4 lbs at sea level **would weigh** only ¼ of a pound at 4,000 miles above the sea level.

- Тело, которое весит 4 фунта на уровне моря, **весило бы (будет, вероятно, весить)** только ¼ фунта на высоте 4000 миль над уровнем моря.

2) В придаточных предложениях после безличных оборотов типа:

It is necessary that - Необходимо, чтобы …
It is essential that - Важно (существенно), чтобы …
It is desirable that - Желательно, чтобы …
It is important that - Важно, чтобы ….
It is improbable that - Маловероятно, чтобы …
It is required that - Требуется, чтобы …

e.g. **It is important that** the propellant remain liquid at the lowest temperature.

- **Важно, чтобы** топливо оставалось жидким при самых низких температурах.

3) В дополнительных придаточных предложениях после глаголов, выражающих *приказание, совет, желание, предположение:* **to require, to demand** (требовать); **to propose, to suggest** (предлагать); **to desire, to wish** (хотеть, желать) (после этих глаголов идет союз **that**) или существительных **requirement, demand** (требование); **proposal** (предложение) и т.п.

e.g. The scientific objectives **require that** a space vehicle **should maintain** a fixed aspect with the respect to the Earth.

- С точки зрения научного исследования **требуется, чтобы** космический корабль **сохранял** определенное положение по отношению к Земле.

e.g. The **demand** is that all measurements **should be made** very accurately.

- **Требование** заключается в том, **чтобы** все измерения **были выполнены** очень точно.

4) В придаточных обстоятельственных предложениях цели после союзов: **so that** (так, чтобы); **lest** (чтобы ... не); **in order that** (для того, чтобы).

e.g. Don't raise the temperature **lest** the speed of reaction **should be** too high.

- Не повышайте температуру, **чтобы** скорость реакции **не была** слишком высокой.

5) В обстоятельственных сравнительных предложениях после союзов: **as if, as though** (как будто бы, как если бы); **but for** (если бы не).

e.g. He spoke **as if** he **were** a specialist on the subject

- Он говорил, **как если бы** он **был** специалистом по этому вопросу.

Примечание: Глагол **"to be"** имеет форму **"were"** для всех лиц в сослагательном наклонении.

6) В условных II и III типа.

Условное предложение II типа (Conditional II) отражает маловероятные, желаемые условия, относящиеся к настоящему или будущему времени.

e.g. **If** some experiments **were repeated,** it **would be** better.

– **Если бы** эксперименты **повторили, было бы** лучше.

Условное предложение III типа (Conditional III) отражает маловероятные, нереальные условия, относящиеся к прошлому.

e.g. They **would have finished** the work in time **provided** they **had had** the necessary material.

- Они **завершили бы** работу вовремя **при условии, если бы** у них **были** все необходимые материалы.

Примечания: 1) Союз **"if"** может быть заменен союзами **unless** (если не); **in case** (в случае, если); **provided, on condition** (при условии, если); 2) Наличие глаголов **should, were** или **had** в начале предложения является основным признаком сослагательного наклонения в бессоюзном условном предложении. Перевод такого предложения следует начинать словами "если", "если бы":

e.g. **Should the engine fail,** the airplane would have to make a forced landing.

- **Если бы двигатель вышел из строя,** самолет должен был бы совершить вынужденную посадку.

Способы перевода сослагательного наклонения:

1) Глаголом в сослагательном наклонении, т.е. глаголом в прошедшем времени с частицей **"бы"**. Частица **"бы"** может присоединяться к глаголу (было **бы**), к союзу (если **бы**) или входить в состав союза "что**бы**" (что**бы** было).

2) Инфинитивом:

e.g. **If** a thermometer **be placed** in a container

- **Если** термометр **поместить** в сосуд

...

3) Глаголом в будущем времени в сочетании со словами "вероятно", "по-видимому":

e.g. Heat **would be absorbed** until the temperature of the absorbing body attains that of the heat.

- Тепло **будет, вероятно, поглощаться** до тех пор, пока температура поглощающего тела не достигнет температуры источника тепла.

1. Translate the sentences into Russian. Pay attention to the verb form in the Subjunctive mood.

1. Would you like to come with us? 2. Would you be so kind as to tell me how to get to the station? 3. Could you tell me the way to the main building of the University? 4. Would you mind giving me your dictionary for a minute? 5. I'd like to thank you for your help. 6. You are the only person she would listen to. 7. You could have done it in a different way. 8. It's strange he is not here. However, he might have forgotten all about it. Or he might have come while I was out. 9. For long journeys in private cars one could use automatic guidance system. 10. One laser beam could carry all the radio, TV and telephone messages simultaneously. 11. Mary wishes she could drive a car. 12. I wish that, for just a day, I were President of the United States. 13. I wish I had not spent so much money yesterday. 14. I wish when a boy I had studied French instead of English. 15. I wish you had mentioned this fact to me before. 16. If he were better educated, he would get the job. 17. Were I you, I should speak to him about it. 18. I would have called you, if I had had your telephone number. 19. Had she felt better, she would have gone with them. 20. K. Onnes found that it was necessary that a mercury wire be cooled to -265° C for electrical resistivity to disappear. 21. Tsiolkovsky proposed that liquid propellants should be used for space travel. 22. Recently it has been improbable that superconductivity should appear at an unbelievable temperature of 98 K in a special ceramic material. 23. The great speeds and high resistance of air demand that new hyperliners be built without windows. 24. It is essential that a superconductor should be a solid material and it is necessary that it should be cooled to -273° C. 25. It was natural for the ancient Greeks to suppose that the stars, planets, the sun and the moon move round the Earth in space. 26. It is possible that a compound should become a superconductor even if the chemical elements constituting it are not. 27. Copernics suggested that the Sun and not the Earth should be at the centre of everything.

2. Translate the sentences into Russian paying attention to the conjunctions: in *order that, so that, lest.*

1. A special system is being developed so that drivers could see after dark. 2. Aircraft designers tend to substitute conventional metal alloys by new composite materials in order that an aircraft structure should be

lighter. 3. Some materials are cooled almost to -273° C so that they should become superconductors. 4. Great attention is paid to ecological problems all over the world so that air in supercities should be kept clean. 5. You must put down this formula lest you should forget it. 6. Metal parts are tested for defects lest they should fail in operation. 7. Students must work hard lest they should fail at the examination. 8. All kinds of safety devices for motor cars are being developed lest accidents should occur. 9. A hypersonic craft will require complicated measures lest it should burn.

3. Define the function of the verb "should" in the following sentences.

1. It should be said that the importance of Mars studies is acknowledged by all. 2. Reliability of every vehicle should be paid great attention to during the production process. 3. It is required that an airplane should be well balanced dynamically. 4. Should there be even a small deviation (отклонение) in the velocity, the space vehicle would pass the planet. 5. K.E. Tsiolkovsky suggested that man-made rocket for the future space flights should use liquid-propelled engines. 6. We were told that we should take part in the discussion. 7. One should not forget that electricity is the most important source of energy at present.

4. Define the function of the verb "would" in the following sentences.

1. Halley predicted that the comet would appear at regular intervals of 75 years. 2. If you were on the first manned space station your task would be to study the stars and the planets including the Earth. 3. Some materials cooled to proper temperature would conduct electricity practically without any resistance. 4. In future it may be possible to build a dirigible with a metal hull that would carry hundreds of passengers round the world. 5. In 1883 Tsiolkovsky wrote that rocket would be the only means able to reach outer space. 6. Popov would make his experiments with radio although the government was not interested in the work. 7. We tried to start the car, but it would not go. 8. We know that a body in motion would continue to travel in a straight line unless some force were applied. 9. Without gravity we would not be able to walk in an upright position. 10. Non-equatorial regions of Mars would be difficult and expensive to reach and explore.

5. Read and translate the sentences where the verb "should" is a modal verb and the sentences where the verbs "would, could and might" are used in the Subjunctive mood.

1. It is essential that international cooperation should be as productive as possible. 2. Research and technology should provide the basis for a better life. 3. Military uses of a space station could complicate international cooperation since there are several neutral countries among the participants. 4. It is desirable that international space cooperation should give significant economic advantage for the countries involved. 5. NASA agreed that Canada would develop a remote manipulation system for the space Shuttle. 6. It should be pointed out that Japan space programmes are based on close government-industry cooperation. 7. The craft to be launched would essentially be used as a service module for space stations. 8. Typical missions of a new system might include the assembly of space structures. 9. Exploring Phobos would be a difficult problem because of its small gravity field. If an astronaut threw a stone right ahead, it would orbit the entire moon and hit in the back of the head. 10. One should know that the broader the basis for utilizing a space station is, the better the prospects for economic efficiency of developing it are. 12. It was reported that the appearance of photon computers could be expected.

6. Read and translate the text without a dictionary.

Exploration experts suggest that the tiny moon Phobos should be used as a perfect place for gas refilling station. Some scientists think Phobos rocks to contain crystalline ice. If one heats them, it will be possible to produce water. The latter could be divided into hydrogen and oxygen which are necessary components for rocket propulsion. Such a fuel supply would greatly reduce the amount of weight that must be delivered from the Earth for manned mission to Mars. Thus, it might be possible for spacecrafts to leave the Earth for Mars carrying no return fuel. To get home, they should simply fill up at Phobos.

7. Define the type of a conditional sentence. Translate the sentences into Russian.

1. If we look around, we can see that electricity is serving us in one way or another. 2. If I were free, I should help you with pleasure. 3. If we had tested this material, we should have used it in our work. 4. If ordinary

gases are greatly compressed, they become liquids. 5. If supercomputers had not been used for thermodynamic calculations, designers would have spent all their lives on computations. 6. If you think that a computer never makes mistakes you are wrong. 7. If extreme temperatures generated by atmospheric friction were not so high, a hypersonic craft would not require complicated cooling measures. 8. If we had been told about the lecture on reliability in spacecraft production, we should have come by all means. 9. Superconductivity can be obtained in some materials if the temperature is very low and close to absolute zero.

8. a) Change the following sentences according to the models.

1. If I were free, I should help you. – Were I free, I should help you.

2. If he had known about the lecture, he would have come. – Had he known about the lecture, he would have come.

1. If it were possible, we should begin this work at once. 2. If he had had all the necessary books, he would have made his report in time. 3. If the books had been available in our library, we could have done this work much earlier. 4. If there were no computers, space flights would be impossible. 5. If drivers were more attentive while driving, there would be less accidents on the road.

b) Translate the sentences into Russian. Pay attention to the word order.

1. Had he used new materials, the device would have been more reliable. 2. Were electric motors used, cars would not pollute the air, would be practically noiseless and very easy to control. 3. Had they applied new method, the result would have been much better. 4. Were the design of cars improved, the fuel consumption would be greatly reduced. 5. Had a less explosive gas been used in dirigibles at the beginning of the century, they would have been in operation since that time. 6. Were it possible to learn how birds find their way, people would use the principle to develop a navigation system for aviation.

9. Translate the sentences into Russian and remember the meaning of the verb "to provide" in all its functions and conjunction "provided".

1. The experiments conducted provided very good results. 2. Russian technological achievements that provided the launching of rockets are

known all over the world 3. A tire pressure display provides information for front and back pairs of tires. 4. Provided new composite materials are used, it will be possible to reduce overall aircraft weight. 5. Provided with a new vacuum-controlled carburetor this car model has several important advantages. 6. Superliners could develop a higher speed provided some special cooling measures were used. 7. An aircraft pilot can get all the information he needs provided he contacts a radio navigation station. 8. The work done provided us with new data. 9. Having measured the distance between two points, it is possible to calculate the time during which a car can cover it, provided we know the car's average speed. 10. Our laboratory has been provided with the latest equipment.

10. Translate the sentences with the conjunctions *provided, if, whether.*

1. Specialists reported that a miniature video camera provided the latest submersible with vision. 2. The speed of a satellite would be less provided it moved at a greater distance from the earth. 3. Drivers don't know yet whether radars will be mounted on the next car model. 4. If the weather is too bad for flying, passenger airplanes don't leave airports. 5. It was very important to find out if electricity could be used for long distance communication. 6. During the entire flight, the pilot is provided with all the necessary information about weather conditions. 7. Modern submersibles can remain at the depth of 20,000 feet for eight hours or, if needed, as long as two or three days. 8. A new system for motor cars can be provided with infrared sensors that can detect a human figure at night. 9. If underwater tourism continued to develop at the present rate, the number of passengers could grow up to millions in only a few years.

11. Translate the sentences with the conjunction *unless.*

1. Isaac Newton stated that a body would continue moving unless some force was applied to stop it. 2. Space flights would be impossible unless special materials for space vehicles were produced. 3. We should have no radio, telephone, television or computers unless there were electricity. 4. The earth temperature would increase indefinitely unless heat were radiated. 5. Unless the temperature rises the speed of the molecules will not increase. 6. It would have been impossible to send satellites into orbit unless Newton's laws of motion had been studied. 7. With heat gen-

The Participle II (Причастие II) выражает действие, законченное по отношению к действию, выраженному сказуемым, и соответствует русским причастиям настоящего времени на **–мый, -щийся** и прошедшего времени, оканчивающимся на **–нный, -тый, -вшийся.**

Функции причастия II

1. **Левое определение:**

an **improved** engine – ***усовершенствованный*** двигатель

2. **Правое определение:**

The engine **improved** by the designer had excellent characteristics – Двигатель, ***усовершенствованный*** конструктором, имел превосходные характеристики.

The engine **improved** had excellent characteristics. – ***Усовершенствованный*** двигатель имел отличные характеристики.

3. **Обстоятельство.** Часто в этой функции с причастием употребляются союзы **when, while** – когда; **if** - если; **though, although** - хотя. В этом случае причастие переводится на русский язык:

1) при + существительное
2) деепричастием
3) придаточным предложением

When tested the instrument showed good results.

1) **При испытании** прибор показал хорошие результаты.
2) **Будучи испытанным**, прибор показал хорошие результаты.
3) **Когда прибор испытывали**, он показал хорошие результаты.

4. **Часть сказуемого:**

Perfect Tenses – has **written** –написал
Passive Voice – was **done** – был сделан

Независимый причастный оборот (The Absolute Participial Construction)

Независимым причастным оборотом называется такой оборот, в котором причастие имеет свое собственное подлежащее, выраженное существительным в общем падеже (или местоимением в именительном падеже). Аналогичной конструкции в русском языке нет. Оборот переводится на русский язык придаточными предложения-

ми, которые вводятся союзами **"так как, поскольку, хотя, после того как, когда; если"** (оборот стоит в начале предложения) или **"причем, а, и, но или бессоюзно"** (оборот стоит в конце предложения).

The difficulties **having been overcome**, we went on making further experiments. – **После того как трудности были преодолены**, мы продолжили выполнять эксперименты.

Независимый причастный оборот с предлогом **with** переводится:

1) союзом **"а"** , если независимый причастный оборот стоит после главного предложения:

A cylinder of a gasoline engine is like a gun, **with the piston taking the place of a bullet.** – Цилиндр бензинового двигателя напоминает ствол ружья, **а поршень двигателя выполняет как бы роль пули**

2) если предложение начинается с независимого причастного оборота, то, помимо указанных выше союзов, при переводе используется также союз **"теперь, когда"**:

With several Earth satellites having been put into orbit, there has been a revival interest in the potential of ramjet engines. – **Теперь, когда несколько искусственных спутников Земли были выведены на орбиту,** вновь появился интерес к прямоточным воздушно-реактивным двигателям.

1. Define the function of the verb with the ending *–ed* Translate the sentences into Russian.

1. The first television set produced quite a sensation in 1939. The first television set produced in 1939 was a tiny nine-by-twelve inch box. 2. Newton's great work published in 1687 is called "Principia". Newton published his great work "Principia" in 1687. 3. The Russian Chemical Society organized more than a century ago is named after Mendeleev. The Russian Chemical Society organized an international conference devoted to the latest achievements in organic chemistry. 4. The energy possessed by the body due to its position is called the potential energy. The new material possessed good qualities. 5. The equipment required to perform laboratory experiments was very complex. The equipment required further improvement. 6. The car model developed a speed of 50 miles an hour. The car model developed by our student bureau will be shown on TV.

2. Translate the following sentences paying attention to the functions of Participles.

1. We need highly developed electronics and new materials to make supercomputers. 2. New alloys have appeared during the last decades, among them a magnesium-lithium alloy developed by our scientists. 3. We are carried by airplanes, trains and cars with built-in electronic devices. 4. Computer components produced should be very clean. 5. Many countries have cable TV, a system using wires for transmitting TV programmes. 6. The fifth-generation computers performing 100 billion operations a second will become available in the nearest future. 7. A videophone has a device which allows us to see a room and the face of the person speaking. 8. New technologies reduce the number of workers needed. 9. Driving a car a man tries to keep steady speed and watch the car in front of him. 10. Having stated the laws of gravity Newton was able to explain the structure of the Universe. 11. Being more efficient than human beings computers are used more and more extensively. 12. Having graduated from Cambridge Newton worked there as a tutor. 13. Having been published in 1687 Newton's laws of motion are still the basis for research. 14. Being invented the digital technology solved the old problems of noise in signal transmission. 15. Having published his book about space exploration in 1895 Tsiolkovsky became known all over the world. 16. Built in the middle of the last century the British Museum is situated in central London.

3. Find Participles in the following sentences. Translate the sentences.

1. Studying Newton's work "Principia" a young physicist discovered a mistake in the calculation. 2. Having designed a car radar the engineers started complex tests. 3. While driving a car one should be very attentive. 4. A new electronic instrument will calculate how far one can drive on the fuel left in the tank. 5. The engine tested showed that it needed no further improvement. 6. Scientists are experimenting with a system allowing drivers to see better after dark. 7. The system being tested will increase the safety and fuel efficiency of a car. 8. Having been tested the computer system was installed at a plant. 9. The night-vision system designed will be available in the 1990's. 10. The synthetic magnet has a lot of valuable qualities that can be changed, if wished. 11. Recently there appeared

battery-powered cars. 12. The radar used was of a completely new design. 13. Having been heated the substance changed its properties. 14. Being provided with batteries an electric car can develop a speed of 50 miles an hour. 15. A defect undetected caused an accident. 16. Though first developed for military purposes radar can be used in modern cars.

4. Choose sentences with the Absolute Participial Construction from the ones given below. Translate the sentences into Russian.

1. The first engines appeared in the 17-th century and people began using them to operate factories, irrigate land, supply water to towns, etc. 2. The steam engine having been invented in 1825, a self-propelled vehicle was built. 3. The supply of steam in the car lasting only 15 minutes, the vehicle had to stop every 100 yards to make more steam. 4. After the German engineer N. Otto had invented the gasoline engine, the application of this engine in motor cars began in many countries. 5. The cars at that time were very small, the engine being placed under the seat. 6. Motorists had to carry a supply of fuel, because there were no service stations. 7. Brakes having become more efficient, cars achieved greater reliability. 8. Cars with internal combustion engines having appeared, the automobile industry began developing rapidly. 9. By 1960 the number of cars in the world had reached 60 million, no other industry having ever developed so quickly.

5. Define the subject of an Absolute Participial Construction. Translate the sentences.

1. Numerous experiments having been carried out at the orbital stations, it became possible to develop new methods of industrial production of new materials. 2. President Jefferson having offered his personal library, the foundation of the Library of Congress was laid. 3. Anthony Panizzi designed the Reading Room of the British Museum, the Reading Room being a perfect circle. 4. A beam of light being transmitted forwards, it is possible to measure the distance between the car and the other cars in front of it. 5. The distance having been measured, the computer adjusts the car's speed. 6. Two metallurgists produced a new superplastic metal, the new steel showing properties identical to Damascus steel. 7. The young physicist having discovered Newton" error, other scientists confirmed it. 8. The first TV sets having been shown in 1939, the news about it spread throughout the world.

6. Translate the following sentences into Russian.

1. When completed in 1897, Gefferson's building was the largest and costliest library in the world. 2. Though being a school teacher of mathematics all his life, Tsiolkovsky concentrated his attention on man's travel into space. 3. If compared to today's TV programme, the first black-and-white pictures were not very good. 4. While being a teacher of deaf people Bell became interested in sound and its transmission. 5. Though discovered, Newton's mistake had no influence on his theory. 6. While working at a new transmitter for deaf people Bell invented a telephone. 7. If heated to 100° C water turns into steam. 8. With the first steam engine built in the 17-th century, people began to use them in factories. 9. The inventor was demonstrating his new device, with the workers watching its operation attentively. 10. With his numerous experiments being over, Newton was able to write his work very quickly. 11. With the current being switched on, the machine automatically starts operating.

7. Change the complex sentences with Participial Constructions.

1. When he was translating the article he used a dictionary. 2. While the student was working at the problem he made many experiments. 3. When the worker was experimenting with this substance he was very careful. 4. After he had left the house he walked to the nearest metro station. 5. When I looked out the window I saw Mary coming. 6. As we finished our part of the work we were free to go home. 7. As Ann had had no time to write to us a letter she sent a telegram. 8. The worker who is repairing the machine is very skilled. 9. The students who are doing the laboratory work are from various faculties.

8. Translate the sentences into English.

1. Читая книгу, он обычно делает заметки. 2. Прочитав текст, мы обсудили его. 3. Отвечая на вопросы, он сделал несколько ошибок. 4. Ответив на вопросы преподавателя, мы начали переводить новый текст. 5. Являясь хорошим проводником электричества, медь широко используется в промышленности. 6. Увидев зеленый свет, мы перешли улицу. 7. Покупая газету, он потерял деньги. 8. Купив газету, он пошел к метро.

9. Translate the text without a dictionary.

A new vacuum-controlled constant velocity carburetor developed by an American company offers several advantages over ordinary carburetors, including 25 per cent gasoline economy, improved engine performance and easier starting. The device having only 54 parts compared with some 300 in conventional carburetors has no choke (дроссель). It constantly adjusts the mixture of fuel and air, which cannot be done in usual carburetors. Provided with special mechanism the carburetor helps the engine turn on at once in cold weather. Though developed quite recently it is already being used by cars and other kinds of public transport. With diesel engine becoming almost standard equipment, the vacuum carburetor will never be used on new cars. It may be said that present-day carburetors are a dinosaur and in 20 years there won't be any more. But there are some countries which are interested in importing the device as a replacement for existing carburetors.

10. Read the text and fill in the table with the information from the text. Using the table speak on the most important car design innovations since 1770.

Car design innovations since 1770	The latest car electronic systems	Their advantages	Their disadvantages
1.			
2.			

Car of Future

Ever since Nicolas Cugnot, a Frenchman, invented the first self-propelled road vehicle in 1770 there has been no shortage of companies willing to make a better automobile. Over years their efforts have given users the gasoline engine (дизель), the electric starter, tubeless tires (бескамерная шина), fuel-injected engines and anti-lock brakes, these are only a few innovations. What is next? Here are some examples of what the car designers are working at in the world today. Engineers are experimenting with a state-of-art (новейший) system that enables drivers to see better after dark. This "night vision" system uses infrared sensors that

can detect a human figure at night more than 1,600 feet away. That's five times the distance at which conventional headlights are effective. The sensors pick up infrared rays emitted by any object that gives off heat. An image-processing system scans the information from the sensors, creating different images for different objects. The images are then displayed on a cathode-ray screen built-in a car's instrument panel. It is like black-and-white photograph of an object ahead. And the system is passive, which means no lights are needed to illuminate the object in front of the vehicle. But the biggest problem will be reducing costs and the other one is the size of the sensor mechanism that is too big now.

One of the latest applications of sophisticated electronics is the wheel-computerized system that not only monitors air pressure in automobile tires but also adjusts it automatically. This system in addition enables a driver to set tire pressure while seated. The system developed consists of three separate modules. The first is the instrument panel display which houses the system's main microprocessor, programming buttons and warning signals. The second component is the detector drive module (модуль привода) that is essentially four microchips attached, in one unit, to the chassis. Each chip detecting pressure changes that may occur, the transistors within the module signal the third component – a programmable transducer (программируемый преобразователь).

The transducer attached to each wheel changes the tire pressure accordingly. However, some automobile experts think this system is too complicated and costly. The design has to be simple and of low cost.

The Gerund
(Герундий)

Герундий (The Gerund) – неличная форма глагола, которая, как и причастие I, образуется с помощью суффикса **-ing**, добавляемого к основе глагола. Герундий обладает как свойствами глагола, так и существительного. В русском языке аналогичной формы нет. По своему значению герундий приближается к русским отглагольным существительным, обозначающим процесс (*хождение, обсуждение, чтение и т.д.*).

Формы герундия

	Active	Passive
Non-perfect (неперфектная форма герундия обозначает действие, одновременное с действием глагола-сказуемого или будущее по отношению к глаголу-сказуемому)	**making**	**being made**
Perfect (перфектная форма герундия обозначает действие, предшествующее действию глагола-сказуемого)	**having made**	**having been made**

Отрицательная форма образуется путем постановки частицы "**not**" перед герундием.

Герундий может переводиться на русский язык ***существительным, инфинитивом, деепричастием и придаточным предложением.***

I like his method of **teaching**. – Мне нравится его метод **преподавания**.

It's no use **talking** to him. – С ним бесполезно **разговаривать**.

He left without **saying** a word. – Он ушел, **не сказав** ни слова.

He was suspected of **keeping** something from us. – Его подозревали в том, **что он что-то от нас скрывает.**

Герундий может иметь перед собой ***предлог, определение, выраженное притяжательным местоимением*** или ***существительным в притяжательном падеже.***

We can increase the current **by reducing** the resistance of the current. – Можно увеличить силу тока, **уменьшая** сопротивление цепи.

C. Функции герундия в предложении

Функция	Пример
Подлежащее (переводится обычно существительным)	**Measuring** temperature is necessary in many experiments. – **Измерение** температуры необходимо при проведении многих экспериментов.
Именная часть составного сказуемого	His hobby is **collecting** stamps. – Его любимое занятие – **коллекционирование** марок.
Часть составного глагольного сказуемого	She **stopped reading**. – Она кончила **читать.**
Прямое дополнение (стоит за глаголом. Переводится: инфинитивом, существительным или придаточным предложением)	He had to stop **experimenting.** – Он вынужден был прекратить **экспериментирование.** Excuse my **interrupting** you. – Извините, **что я прерываю вас.**
Предложное дополнение (употребляется после любого глагола или прилагательного, требующего предлога. Переводится: существительным или придаточным предложением; можно переводить инфинитивом, если отвечает на вопрос "что делать?")	He **succeeded in obtaining** reliable results. – Ему удалось **получить** надежные результаты.
Определение (с предлогом **of**)	These devices have the advantage **of being** cheap. –Эти приборы имеют то преимущество, **что они дешевые.**
Обстоятельство (всегда с предлогом. Переводится деепричастием, существительным с предлогом или придаточным предложением. Полезно запомнить перевод некоторых предлогов в сочетании с герундием: **-in** (при); **on, upon** (после, при); **by** (путем, при помощи); **without** (без). - Герундий с предлогом **by** во многих случаях переводится деепричастием. - Герундий с предлогом **without** также часто переводится деепричастием с частицей **"не".**	The engineer could solve this problem only **after experimenting.** – Инженер мог решить этот вопрос только **после экспериментирования.** **Without increasing** the speed … - **Не увеличивая** скорости …

Герундиальный оборот

(The Gerundial Construction)

Герундиальный оборот состоит из существительного (в притяжательном или общем падеже) или местоимения (притяжательного или личного в объектном падеже) + герундий. Этот оборот часто вводится словами: **что; то, что; того, чтобы; чтобы.**

His taking part in the development of the new cooling system was of great help to us. – **То, что он принимал участие в разработке новой системы охлаждения**, было для нас большой помощью.

Kurchatov's having devoted all his life to nuclear physics is known to everybody. – **То, что Курчатов посвятил всю свою жизнь ядерной физике,** известно всем.

1. Choose the sentences with the Gerund from the ones given below and translate them.

1. On detecting danger on the road, the computer signals the driver. 2. Detecting an object in front of a car in the dark is the purpose of the "night vision system". 3. One of the main problems of a driver on the road is keeping the speed constant and watching the cars ahead. 4. A new device for monitoring and adjusting air pressure in tires has recently been developed. 5. Before starting a car one must examine it carefully. 6. Computers are widely used for controlling all kinds of processes. 7. Alexander Bell's being a teacher of deaf people influenced his interest in sound and its transmission. 8. Starting a car one must be very attentive. 9. Samuel Morse's hobby was experimenting with electricity.

2. Translate the following sentences paying attention to the function of the Gerund.

1. One of the best ways of keeping the speed steady is using a computer for this purpose. 2. Newton's having made a mistake in his calculations has no influence on his theory. 3. Supercomputer is able of performing one billion operations a second. 4. On being turned on the radar will warn the driver about stationary or slow-moving objects on the road. 5. Upon being heated the molecules begin moving very rapidly. 6. The white line in the centre of the road is one of the most effective means of controlling traffic. 7. On graduating from the Moscow Higher Technical School S.P.Korolev began working in the field of rocket design. 8. The

function of a car computer is detecting and summing up the information about the road conditions. 9. Monitoring and adjusting air pressure in tires is one of the new developments of the car designers. 10. It is difficult to solve some of the present-day scientific and technological problems without using supercomputers. 11. On seeing a red light on a panel and on hearing a warning sound the driver should decrease the speed. 12. By picking up infrared rays emitted by objects ahead of the car an image-processing system produces different images of objects. 13. On studying for half an hour before an exam one should switch over to some other activity.

3. Choose the Gerund in the function of an adverbial modifier.

1. Flying from Los Angeles to Tokyo on board a new supersonic craft will take two hours. 2. On examining the car before starting on a long journey a driver can be sure that he will get to his destination without accidents. 3. By summing up the information about the speed and distance of various objects on the road, the computer detects all possible danger. 4. A superliner of a new kind will be capable of flying at five times above the speed of the sound. 5. The only way of overcoming the great air resistance at high velocities is flying higher. 6. At low speeds the engine can use turbines for compressing the air before mixing it with fuel in the combustion chamber. 7. In future in switching over to the new Earth satellite a driver can be sure of coming safely to his destination. 8. Cryogenic fuels will vaporize before being ejected into combustion chamber. 9. In flowing over the aircraft's surface the fuel cools its skin. 10. On reaching its cruising speed the supersonic liner will fly at 100,000 feet above the Earth. 11. By using supercomputers it is possible to avoid making mistakes in extremely complicated thermodynamic computations. 12. A new carburetor offers easier starting in cold weather. 13. By using the automatic guidance system a driver will be able to make long journeys without concentrating on the road conditions. 14. It is impossible to solve economic problems without using the achievements of the scientific and technological revolution.

4. Choose the sentences with the Gerund. Translate the sentences.

1. Overcoming these difficulties is not so easy as it may seem. Overcoming these difficulties the designers can increase the fuel efficiency. 2. Setting a problem the scientist makes the first step to its solution. Set-

ting a problem is the first step to its solution. 3. Covering the distance between Tokyo and Moscow is less than two hours this superliner develops a speed five times above the speed of sound. Covering the distance between Tokyo and Moscow on board a superliner requires about two hours. 4. Putting the discovery into practice the engineers will solve a complicated technological task. Putting the discovery into practice sometimes requires more effort than making it.

5. Read and translate the text without a dictionary.

"Even the birds aren't flying today" is an old saying used to indicate that the weather for flying is extremely bad. And for man nothing has greater effect on flying than the weather. And because of its changing so quickly and without warning an extensive network of weather stations has been established for helping the pilots get all the information about weather. Before flying pilots may get current weather information on changing conditions along their route or at their destination. The weather reporting system helps overcoming many difficulties in flying. In winter, e.g., icing can cause the reduction of lift efficiency of airplane by changing the flow of air. Pilot's being informed about the weather allows him to avoid weather problems. The weather being too bad, pilots just stay on the ground like any wise bird.

6. Read and translate the text paying attention to the Participles and Gerund. Make up an abstract of the text.

The Return of the Dirigibles

When it comes to technology, people are not inclined to return to the past. Yet, some exceptions do exist. Such is the attitude at present towards dirigibles. Having abandoned the skies more than 40 years ago, they have suddenly began to reappear. Designers have once again sat down to design this kind of transportation. Their use can still be limited, but there is no doubt, that dirigibles are coming back.

Why is dirigible attractive? What do you do with it? As its cruising speed is about 60 miles per hour it is too slow to be used as a passenger carrier. But it is cheaper to operate than a helicopter, comfortable and capable of flying for several days. The craft's large size and staying power (dirigibles have remained in skies for as long as a week) make it ideally suited for exploration.

Their use in countries that have large territories and are rich in forests and are planning to explore and exploit new regions is most promising. They may be used to make geological survey and to make maps, to look for off-shore oil and minerals, to take tourists to roadless, but beautiful places, to deliver heavy loads to remote regions and bring the products back. They have a potential use as a flying platform. In general, their possibilities are endless. They do not need expensive runways, required by cargo planes.

Besides, the technological possibilities of manufacturing these crafts have changed. In 1920 and 1930's the dirigibles were manned by a big crew. Today being equipped with electronic control they can be operated by three pilots.

The modern dirigibles have one more important advantage over older models – that of a complete safety in flight, for, instead of hydrogen, they are filled with helium which does nor burn. The craft is 200 feet long and is made of superstrong material.

In future it may be possible to build a dirigible with a metal hull that could carry hundreds of passengers and transport cargo around the world. In fact, it is probably as a cargo vehicle that the dirigible will have the best chance to find its use.

7. Translate the text using the non-finite forms.

1. То, что он измерил расстояние, поможет ему подсчитать интенсивность света. 2. Одна из самых ранних идей (про)двигать транспортное средство, используя механическую силу, была предложена И. Ньютоном. 3. Использовав двигатель, приводимый в движение паром, французский инженер построил транспортное средство для двух пассажиров. 3. Много раз А. Белл хотел прекратить свои опыты, т.к. не смог получить каких-либо результатов. 4. С древних времен люди мечтали о полетах (летать).

The Infinitive

Инфинитив (The Infinitive) представляет собой неличную форму глагола, которая только называет действие, не указывая ни лица, ни числа.

Формальным признаком инфинитива является частица ***to***. Однако в некоторых случаях частица опускается.

Отрицательная форма образуется путем постановки частицы ***not*** перед инфинитивом.

Формы инфинитива

Infinitive	Active	Passive
Indefinite	**to ask**	**to be asked**
Continuous	**to be asking**	-
Perfect	**to have asked**	**to have been asked**
Perfect Continuous	**to have been asking**	-

Функции инфинитива

Функция	Пример
Подлежащее	**To obtain** these data is necessary for our further work. – **Получение** этих данных – необходимое условие для нашей работы.
Часть составного именного сказуемого	His aim ***is*** **to obtain** these data. – Его цель – **получить** эти данные.
Часто составного глагольного сказуемого В сочетании с модальными глаголами и их эквивалентами: **to be sure** (несомненно), **to be certain** (безусловно), **to be likely** (вероятно), **to be unlikely** (вероятно не: вряд ли)	The engineer ***wanted*** **to ensure** the successful operation of the bypass turbojet engine. – Инженер ***хотел*** **обеспечить** успешную работу двухконтурного турбореактивного двигателя. This ***is unlikely*** **to be achieved.** – ***Маловероятно***, что это **будет достигнуто.**
Дополнение	The professor asked the students **to make** the experiment. – Профессор попросил студентов **провести** эксперимент.
Определение (часто после слов: **the first, the second, the third**)	The device **to be used** has been carefully examined. – Прибор, **который будет использоваться**, тщательно проверен. He was ***the first*** **to apply** the new method of work. – Он ***первым*** **применил** новый метод работы.
Обстоятельства: **цели** **следствия**	**To obtain** the reliable data it is necessary to make a lot of experiments. – **Чтобы получить** надежные результаты, необходимо провести много экспериментов. The method is not accurate enough **to give** reliable results. – Этот метод недостаточно точен, **чтобы дать** надежные результаты.

Объектный инфинитивный оборот (Complex Object)

Объектный инфинитивный оборот состоит из существительного в общем падеже или личного местоимения в объектном падеже (me, him, her, you, us, them) и инфинитива. На русский язык переводится дополнительным придаточным предложением, вводимым союзами "что", "чтобы".

e.g. We know this **scientist (him) to have made** an important discovery in electronics.

– Мы знаем, что этот ученый (он) сделал важное открытие в электронике.

Объектный инфинитивный оборот **употребляется:**

после глаголов: **wish, want, would like.** Перед инфинитивом ставится частица ***to***.

e.g. Do you really want **him to come**?

– Ты на самом деле хочешь, чтобы он пришел?

после глаголов, выражающих предположение: **expect, think, consider, believe, suppose, find** (считать). Перед инфинитивом ставится частица ***to***.

e.g. We know **him to be** an aircraft designer.

– Мы знаем, что он конструктор авиационных двигателей.

после глаголов со значением "физического восприятия": **see, watch, notice, hear, observe.** Инфинитив **без** частицы ***to***. После этих глаголов может употребляться как инфинитив (если действие завершено), так и причастие I (если действие продолжается).

e.g. He saw **me approach** the gate.

– Он видел, как я подошел к калитке.

He saw **me approaching** the gate.

– Он видел, как я подходил к калитке.

после глаголов, выражающих просьбу, совет, разрешение и побуждение к действию:

ask, allow, tell, order (перед инфинитивом ставится частица ***to***)

make, let, have (инфинитив употребляется **без** частицы ***to***).

e.g. The engineer **made** his assistants **check** the results many times.

– Инженер заставил ассистентов проверить результаты несколько раз.

Субъектный инфинитивный оборот (Complex Subject)

Субъектный инфинитивный оборот состоит из существительного в общем падеже (или местоимения в общем падеже) и инфинитива (всегда с частицей ***to***). Перевод предложений следует начинать со сказуемого и, если требуется по смыслу, вводится союз ***что***.

Между компонентами сложного подлежащего может стоять сказуемое, выраженное:

глаголом в форме страдательного залога: **to be said, to be reported, to be known, to be stated, to be supposed, to be considered, to be seen, to be expected, to be believed** и др.

e.g. **These elements *are known* to have been found** twenty years ago. – Известно, что эти элементы были открыты двадцать лет назад.

глаголом в форме действительного залога: **to seem** (казаться), **to appear , to prove** (оказываться), **to happen** (случаться, оказаться).

e.g. **This substance *seems* to possess** useful properties. – Кажется, это вещество обладает полезными свойствами.

в сочетаниях: **to be likely, to be unlikely, to be sure, to be certain.**

e.g. **Such engines *are certain* to be well suited** for civil aircraft. – Несомненно, что такие двигатели хорошо подходят для гражданских самолетов.

Инфинитивный оборот с предлогом *for*

For + существительное в общем падеже или местоимение в объектном падеже + инфинитив. На русский язык чаще переводится придаточным предложением.

e.g. **For the decision to be correct**, all facts must be considered. – Чтобы решение было правильным, следует учесть все факты.

1. Define the function of the Infinitive. Translate the sentences.

1. To develop a new submersible craft with a manipulator is not an easy task. 2. To develop the supercomputer highly developed electronics and new materials were required. 3. One of the best ways to keep the car

speed steady is to use a computer. 4. Experiments helped Mendeleev to discover the properties of new chemical elements. 5. Francis Chichester was the first to sail round the world by himself. 6. Some materials with new useful properties may be produced in space. 7. A special electronic device signals the engine to stop. 8. Radar may control the brakes to avoid collisions with other cars. 9. High temperature alloys make it possible for jet engines to be operating under severe conditions for a long period of time. 10. Recently a radar to be mounted on cars has been developed. 11. To help helicopters and aircraft find the capsule, its upper part is covered with special paint which can be detected by radar. 12. The radar detects the stationary objects ahead of the car to warn the driver about them and slow down the speed.

2. Choose the sentences with the Infinitive in the function of an object and attribute.

1. To design, construct and operate a laser system is a great technological achievement. 2. To protect the water resources, forests and atmosphere several laws were passed in Russia in the 1970's. 3. A very interesting problem is to produce a practically limitless source of communication. 5. There are projects to use lasers for long distance communication. 5. Automation makes it possible to obtain and develop new sources of energy. 6. To combine laser and thermonuclear reaction is a very interesting problem for the scientists in many countries. 7.Lasers to be placed on Earth satellites will transform solar radiation into laser beams. 8. To put some projects with lasers in operation great technological difficulties must be overcome. 9. One of the ways to make planes as economical as possible is to lighten the aircraft by using new composite materials. 10. Signals to be measured must be strong enough.

3. Translate the sentences paying attention to the non-finite forms.

1. The new system developed increased the safety and efficiency of a car. 2. The laser's most important potential use may be its long distance communication applications. 3. Provided the problem of using laser for controlled thermonuclear reaction were solved, the capacity of the pulse received would be much greater than all the world's power plant capacity. 4. All a pilot needs to do is to tune to radio transmitters and he will get di-

rection signals he needs. 5. One of the problems scientists are working at is to transmit energy to space stations by using lasers. 6. A hypersonic aircraft will require complicated cooling measures because of the extreme temperatures appearing. 7. Aircraft designers are interested in all kinds of new materials that are strong enough to be used for high-speed airliners. 8. Noise and vibration are also the problems to be faced by designers of hypersonic craft. 9. Besides, there is one more problem to be studied – that of surface cooling. 10. The ordinary aircraft windows would make the future superliner structure too weak to withstand great stresses developed.

4. Translate the sentences paying attention to Complex Object.

1. We know Morse to have been a painter by profession. 2. Scientists expect laser to solve the problem of controlled thermonuclear reaction. 3. M. Faraday supposed a beam of light to reverse its polarization as it passed through a magnetized crystal. 4. Designers expect dirigibles to be used for exploration of new territories. 5. Engineers suppose a new "night vision" system to enable drivers to see better after dark. 6. Scientists believe new laser devices to be widely used in medicine. 7. We know the first digital optical disks to have been produced in 1982 as disks for music.

5. Translate the sentences.

I. 1. Hundreds of radio navigation stations watch the airplanes find their destination and land safely. 2. Twice a year people see birds fly south and north, but we don't know how they find their way. 3. When you stand near a working engine you feel it vibrate. 4. Making experiments with electric telegraph Morse noticed a pencil make a wavy line when connected to an electric wire.

II. 1. A force applied to a body causes it to move in a straight line. 2. The unsatisfactory results of Bell's experiments forced him to change the method of testing. 3. The excellent properties of Damascus steel made metallurgists of the whole world look for the lost secret of the steel. 4. Very high temperatures often cause certain materials to break. 5. Bad weather conditions make pilots switch over to automatic control.

6. Translate the sentences paying attention to the structure "for + object+ infinitive".

1. The students were waiting for the lecturer to describe the properties of a new composite material. 2. It is for you to decide which of the two methods to use. 3. It is necessary for the students to know the properties of various alloys. 4. A system of satellites is provided for people to watch the central TV program.

7. Translate the sentences paying attention to Complex Subject.

a) 1. Students of Cambridge are supposed to wear gowns at lectures. 2. The first pocket.-size colour television sets were reported to have been developed. 3. Today's aircraft is expected to be replaced by a new model of hypersonic aircraft by the 2000. 4. Intensive research on optical-electronic computer is said to be going on in a number of US companies. 5. A method for recording information on crystal by means of laser is known to have been developed by a Russian researcher. 6. The annual output of personal computers is expected to reach millions in the nearest future. 7. Laser is known to be a device producing an intensive beam of light by amplifying radiation. 8. Optical technology has been found to be cost-effective. 9. The optical equivalent of a transistor is reported to have been produced.

b) 1. Our present-day life seems to be quite impossible without telephone, radio and television. 2. Nowadays the principle of radio operation seems to be quite simple. 3. The term "radio" is known to be composed of the first letters of "radio, detection and ranging". It happens to reflect its basic principle, that is, the location of an object at a distance. 4. About 50 per cent of Lake Baikal water prove to have been polluted since the Baikal plant has begun its work. 5. Lasers appeared to be highly useful for solving the problem of controlled thermonuclear reaction and communication. 6. A system of Earth satellites appears to have solved the problem of transmitting the central TV programme to any part of the world. 7. Electricity proved to be able to travel instantly over a long piece of wire.

c) 1. Dirigibles are likely to be used for taking tourists to distant and beautiful places. 2. Lasers are likely to be used in our everyday life soon.

3. Superconductivity is certain to bring about a new technological revolution.

8. Translate the sentences.

1. Designers report a new manned craft to be able to submerge to the depth of 21,000 feet. A new manned craft is reported to be able to submerge to the depth of 21,000 feet. 2. We know radio navigation stations to be located at different places around the world to guide the pilots. Radio navigation stations are known to be located all over the world to guide the pilots. 3. People considered dirigibles to be too slow and unreliable, that is why they were not used for a long time. Dirigibles were considered to be slow and unreliable. 4. Experts expect the new submersible craft to move round the ocean floor like a sports car. The new submersible craft is expected to move round the ocean floor like a sports car. 5. Scientists in many countries consider propeller engines to be much more economical. Propeller engines are considered much more economical. 6. We know propeller planes to fly slower than jet planes, therefore, a new ventilator engine with a propeller has been built. But as propeller planes are known to fly slower than jet planes a new ventilator engine with a propeller has been built.

9. Choose the sentences with Complex Subject. Translate the sentences.

1. The phenomenon of superconductivity appears to have been discovered as early as 1911. 2. Before 1911 superconductivity was assumed to be impossible. 3. Recent discoveries in superconductivity made scientists look for new conducting materials and for practical applications of the phenomenon. 4. The latest achievements in the field of superconductivity are certain to make a revolution in technology and industry. 5. Recommendations from physicists will allow the necessary measures to be taken to protect the air from pollution. 6. Lasers are sure to do some jobs better and more economically than other devices. 7. M. Faraday supposed a light beam to reverse its polarization as it passed through a magnetized crystal. 8. Superconductors are likely to find applications we don't even think of at present. 9. A Dutch physicist found a superconducting material to return to normal state when a strong magnetic field was applied.

10. Properties of materials obtained in space prove to be much better than those produced on Earth. 11. There are prospects for lasers to be used in long distance communication and for transmission of energy to space stations. 12. The electrical resistivity of a mercury wire was found to disappear when cooled to -269° C. 13. Additional radio transmitters let the pilot make his approach to an airport by watching his flight instruments. 14. There seems to be a lot of alloys and compounds that become superconductors under certain conditions.

10. Translate the text without a dictionary.

The ancient Greeks are known to have been great watchers of the sky and also great thinkers. As they watched the sky night after night, it was natural for them to think that the Earth stood and the stars, planets, sun and moon were moving round the earth in space. They thought the sun to be between Venus and Mars. To explain the movement of the planets, however, was difficult. Then one day a young scientist named Copernics at Cracow University in Poland supposed that the sun and not the Earth should be the centre of everything. He was the first to explain properly our solar system. The ancient Greeks had made the mistake of thinking that because the stars and planets seemed to move as they looked at the sky, the Earth must stand. If you sat in a train and looked out at the trees, it would be easy to understand their mistake. The trees seem to be moving backwards, but really it is the train that is moving forwards.

Приложение 1

Таблица неправильных глаголов

Infinitive	Past Simple	Participle II	Перевод
to be	was/were	been	быть
to beat	beat	beaten	бить
to become	became	become	становиться
to begin	began	begun	начинать(ся)
to blow	blew	blown	дуть
to bet	bet	bet	держать пари
to break	broke	broken	ломать
to bring	brought	brought	приносить
to broadcast	broadcast	broadcast	вести передачу
to build	built	built	строить
to burn	burnt	burnt	гореть, жечь
to buy	bought	bought	покупать
can	could		мочь, уметь
to catch	caught	caught	ловить, поймать
to chose	chose	chosen	выбирать
to come	came	come	приходить
to cost	cost	cost	стоить
to creep	crept	crept	ползти
to cut	cut	cut	резать
to dig	dug	dug	копать
to do	did	done	делать
to draw	drew	drawn	тащить, рисовать
to drink	drank	drunk	пить
to drive	drove	driven	везти
to eat	ate	eaten	есть, кушать
to fall	fell	fallen	падать
to feel	felt	felt	чувствовать (себя)
to fight	fought	fought	бороться
to find	found	found	находить
to fly	flew	flown	летать
to forbid	forbade	forbade	запрещать
to forget	forgot	forgotten	забывать
to forgive	forgave	forgiven	прощать
to freeze	froze	frozen	замерзать

to get	got	got	получать, становиться
to give	gave	given	давать
to go	went	gone	идти, ехать
to grow	grew	grown	расти, выращивать
to have	had	had	иметь
have to	had to		должен, вынужден
to hear	heard	heard	слышать
to hold	held	held	держать
to keep	kept	kept	держать, хранить
to kneel	knelt	knelt	становиться на колени
to know	knew	known	знать
to lead	led	led	вести
to learn	learnt learned	learnt learned	учиться, узнавать
to leave	left	left	покидать
to lend	lent	lent	давать взаймы
to let	let	let	позволять
to light	lit	lit	зажигать
to lose	lost	lost	терять
to make	made	made	делать, создавать
may	might		мочь, иметь возможность
to mean	meant	meant	значить, иметь в виду
to meet	met	met	встречать (ся)
to put	put	put	класть, ставить
to read	read	read	читать
to ring	rang	rung	звонить, звенеть
to run	run	run	бежать
to say	said	said	сказать, говорить
to see	saw	seen	видеть
to seek	sought	sought	искать, разыскивать
to sell	sold	sold	продавать
to send	sent	sent	посылать, отправлять
to set	set	set	помещать, класть
to sew	sewed	sewn/sewed	шить
to shake	shook	shaken	трясти
to shine	shone	shone	светить, сиять
to show	showed	shown	показывать
to shrink	shrank	shrunk	садиться,давать усадку
to shut	shut	shut	закрывать

to sing	sang	sung	петь
to sit	sat	sat	сидеть
to sleep	slept	slept	спать
to slide	slid	slid	скользить
to speak	spoke	spoken	говорить, разговаривать
to spend	spent	spent	тратить, проводить время
to spit	spat	spat	плевать, брызгать
to split	split	split	раскалывать, расщеплять
to spread	spread	spread	распространять
to spring	sprang	sprung	снабжать пружиной
to stand	stood	stood	стоять
to stick	stuck	stuck	втыкать, накалывать
to sting	stung	stung	жалить
to sweep	swept	swept	мести, подметать
to swim	swam	swum	плавать
to swing	swung	swung	качать, колебать
to take	took	taken	брать, взять
to teach	taught	taught	учить, обучать
to tear	tore	torn	рвать, разрывать
to tell	told	told	сказать, рассказывать
to think	thought	thought	думать
to throw	threw	thrown	бросать
to understand	understood	understood	понимать
to upset	upset	upset	опрокидывать,
to weep	wept	wept	плакать
to win	won	won	побеждать
to write	wrote	written	писать

Учебное издание

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