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PASSIVE VOICE

Ex. 1. Put the following statements into the Passive Voice.

Example: New results confirm this idea. – This idea is confirmed by new results.

1. Many laboratories study this effect.
2. The work at the laboratory stimulates students' inventiveness.
3. Edison invented the phonograph in 1877.
4. The researcher made another attempt to find an error.
5. The teacher will explain the phenomenon.
6. Physicists will use a new technique.
7. We have divided the problem into two parts.
8. He has found a new formulation.
9. Now the students are measuring the light velocity.
10. Engineers are widely applying computers in practice.

Ex. 2. Translate into Russian. Mind the translation of the Passive Voice.

A.

1. English classes are always attended by all students.
2. The reaction was watched with great attention.
3. At the beginning of the term our group will be joined by other students.
4. Many important questions dealing with plasma have already been answered.
5. Biochemical processes may be influenced by various factors.

B.

1. Physics is looked at as an ahistorical subject.
2. The accuracy of this method was spoken of at the conference.
3. These measuring instruments were not even thought of twenty years ago.
4. Wait a minute. The microscope has just been sent for.
5. Einstein's theory of relativity can always be relied on.

C.

Example: This law is often referred to. – На этот закон часто ссылаются.

A practical class at the Institute is referred to as a seminar. – Практическое занятие в институте называется семинаром.

1. The Feynman lectures on physics are often referred to at our seminars.
2. Don't include those results in your paper. They have been referred to many times.
3. The experiment destroying the ether-wind theory is referred to as Michelson-Morley experiment.
4. In the 60's the seminar in which many well-known physicists took part was referred to as the Landau seminar.

D.

Remember several meanings of the verbs.

To follow	следовать за кем- / чем-либо придерживаться теории / метода и т.п. наблюдать / следить за кем- / чем-либо

1. Lectures are always followed by practical work.
2. Thomson's discovery of the electron was followed by new striking discoveries.
3. The same technique was followed in all the experiments.
4. The processes on the earth are being followed from the spaceships.
5. The changes of temperature will be followed by using new methods.

To precede — предшествовать, находиться, идти впереди

1. The experiment was preceded by a talk with a teacher.

2. Every flight has always been preceded by a thorough control of luggage.
3. A great number of experiments preceded cloning Dolly.
4. Cloning Dolly was preceded by a great number of experiments.
5. According to the plan the lecture will be preceded by a few words of greeting.
6. All the necessary information is located on the preceding pages.
7. The week preceding the court hearings (слушания в суде) had been tense and nervous.
8. The results described in the preceding sections appear to support our conclusion.

Ex. 3. Translate into Russian.

1. The development of this particular problem is included in the plan of our work.
2. The definitions that had been given at the last lecture were involved into this report.
3. The relationship that exists between these two concepts has recently been defined.
4. After his attempts to give a concise description of the method he was asked to describe it more completely.
5. In this experiment they were told to measure certain physical quantities.
6. The history of the development of physical ideas is being studied now.
7. A greater part of the discussion has been devoted to the quantitative methods in science.
8. In this paper some attempts will be made to define the relationships among neighbouring sciences.
9. All even the least complex aspects of the problem had been discussed before they started the experiment.
10. His new invention has been much spoken about.
11. Today electricity and magnetism are thought of as different aspects of a single concept of electromagnetism.

12. It can be seen in the figure that the body is acted upon by several forces.
13. Once a body has been set in motion, it may not stop moving when the force is removed.
14. Their fruitful methods are referred to in different papers.
15. Optical phenomena resulting from the presence of a magnetic field will be referred to in the subsequent sections of the paper.
16. The energy needed to remove one photon or neutron from the nucleus of a particular element is referred to as separation energy.
17. If by convention a qualitative description is followed, the results may become accurate.
18. It is to be emphasized that in our case Ewing's theory of magnetism should be followed.
19. The reduction of gas pressure was followed by the reduction of gas temperature.
20. Every experiment is preceded by a talk with a teacher.
21. The appearance of Bohr's atomic model was preceded by numerous planetary models of the atom.
22. When I entered the laboratory the experiment was still being made.
23. The frictional forces were dealt with in the previous chapter.
24. This problem is dealt with in the last chapter of his book on solid-state physics.
25. In this particular case the random motion of particles is slightly acted upon by temperature changes which may be disregarded in the future analysis.
26. It is quite obvious that science is affecting and being affected by social changes of our time.
27. The phenomenon dealt with in his report is attributed to the formation of ozone.
28. Energy loss has been prevented by maintaining the voltage at the same mean value.

29. In a diatomic molecule the force pulling the atoms together may be thought of as proportional to the distance between the atoms.
30. This problem cannot be dealt with unless more precise data are obtained.
31. Careful attention must be paid to the algebraic signs when using the equation.
32. Care should be taken to conserve the distribution of the charge placed in the immediate vicinity of the probe one.
33. Maxwell's law of distribution of velocities may be relied upon in determining the positions and energy distribution of gas molecules.

Ex. 4. What should you begin the translation with?

Example: Ниже будет дано определение нового термина. – The definition of a new term...

1. В первый параграф включена общая классификация физических наук.
2. Здесь не обсуждаются основные величины измерений.
3. В конце статьи рассматриваются преимущества данного метода и приводятся (даются) интересные экспериментальные наблюдения.
4. Сейчас в биологии широко (widely) применяется этот метод.
5. Каждый вторник в нашей лаборатории проводились (to give) научные семинары.
6. В то время было сделано много попыток объяснить этот парадокс.
7. В данной работе будут описаны новые теории и гипотезы.
8. Во время опыта будут определены новые параметры.
9. Статья этого ученого делится на две части.
10. Мы уверены, что в ближайшем будущем будет разработана новая теория.
11. Об этом открытии много говорят.

12. В данный момент вычисляется распределение молекул.
13. Напряженность электрического поля измерялась посредством пробного заряда (a probe charge).
14. На эти данные не следует ссылаться.
15. В последнем эксперименте были исследованы тепловые и механические свойства газа.

MODAL VERBS

Ex. 1. Mind the translation of 'one' before the Modal Verbs.

One can (may) use…	Можно использовать…
One could (might) use…	Можно было бы использовать…
One must (should, ought to) use…	Надо (следует) использовать…
One can't (mustn't) use…	Нельзя использовать…
One shouldn't (oughtn't to) use…	Не следует использовать…
One needn't use…	Не надо использовать…

1. One can make another attempt and carry out a more precise measurement.
2. One must describe these events as concisely as possible.
3. One may use more fruitful methods this time.
4. One should clearly distinguish the fundamental science from the neighbouring ones.
5. One could admit (допускать) all possible hypotheses in our case.
6. One might devote more time to the development of new ideas.
7. One shouldn't look only on the dark side of things.
8. One oughtn't to interfere with their plans.
9. One needn't give a quantitative analysis of the process.

10. One can't attribute the failure only to inadequate accuracy of the apparatus.

Ex. 2. Translate into Russian. Mind the translation of the Modal Verbs with Perfect Infinitive.

must attend	должен посетить
must have attended	должно быть, посетил
should attend	следует посетить
should have attended	следовало бы посетить (в прошлом)
could attend	смог посетить, смог бы (в будущем)
could have attended	смог бы посетить (в прошлом)
can't attend	не может посетить
can't have attended	не может быть, что посетил (вряд ли посетил)
may (might) attend	вероятно, возможно посещает (посетит)
may (might) have attended	вероятно, возможно посетил

1. You could have found a lot of applications of your discovery.
2. Scientists must have made numerous attempts to explain how nature operates.
3. Walter was in a terrible mood today. He must have got up on the wrong side of the bed.
4. Henry looks so embarrassed. He must have failed his exam.
5. He can't have failed his exam. He is so industrious and hardworking.
6. The students may have been reading for an exam since morning.
7. Michael rode his bicycle downtown yesterday. He could have been knocked down.

8. You didn't get the job. You should have spoken more confidently at the job interview.
9. Why does Fred look so exhausted (tired)? He may have worked overtime last week.
10. Do you realize now that you should have done a few things differently to be promoted to a new position?
11. George didn't come to his English class and all the students think he might have gone to the airport to meet his relatives.
12. You could have got to the University by bus. Why did you hitchhike?

Ex. 3. Translate into Russian. Mind the translation of *to be + Infinitive.*

a) to be + Infinitive –	действие должно совершиться согласно плану, договоренности, инструкции и т.д.
b) to be + Perfect Infinitive –	действие должно было совершиться согласно плану, договоренности, инструкции и т.д., но не совершилось.

1. What am I to do next?
2. By convention we are not to violate (нарушать) the instructions given below.
3. No doubt this field of science is to provide opportunities for first class research.
4. In the near future such devices are to be used to advance many fields of science.
5. Liquid crystal devices were to perform extremely important functions.
6. They agreed that she was to put off the investigation.
7. John was to have taken part in the competition. He is still in bed with the flu.

8. The test was to have been performed by the end of the month.

Ex. 4. Translate into Russian. Mind the translation of the Modal Verbs.

1. We have thus been able to make our own contribution to the new invention.
2. We are unable to solve the problem directly; we have to seek other ways.
3. Nothing can be done in addition to what has already been done.
4. In future we shall have to do nothing but to repeat the measurements.
5. I don't have to explain that working contacts with other laboratories ought to be developed.
6. For writing a program a scientific problem has to be stated clearly.
7. The test might last a month but we had to complete it much sooner.
8. Unless he is allowed to work under your guidance he won't be able to carry out this research.
9. He needn't be told that an interferometer is an instrument which uses the phenomenon of interference.
10. His invention was to result in great achievements in space technology.
11. All your remarks are to be pertinent to practical applications rather than (а не) to the theory itself.
12. If you seek to determine the temperature of the sea you are to investigate the influence of the winds.
13. One mustn't forget that learning English involves certain difficulties and a great deal of training.
14. One should mention that the confirmation of a new hypothesis will require much more effort.
15. There can be no doubt that his results coincide with mine.
16. There may exist a great number of means to prevent the trouble (поломка).

17. In addition there should be an experimental confirmation of your predictions.
18. I shall be able to devote you some time, if nothing interferes with my plans.
19. One should distinguish clearly the nature of these physical phenomena.
20. In this particular case one has to seek for a more precise formulation of the topic.
21. Like mathematicians the physicists have to express their physical ideas as concisely as possible.
22. In addition to the main aspects of physics the students are to study the neighbouring sciences.
23. Complex measurements of physical quantities must be made as accurately as possible.

INFINITIVE

Ex. 1. Translate into Russian. Analyze the function of the Infinitive.

1. To gain (получать) experience is only a matter of time.
2. To solve a particular problem is necessary for future investigations.
3. To solve a particular problem we ought to divide it into subproblems.
4. In order to understand the phenomenon scientific intuition is required rather than (а не) experiments.
5. The history of science should be studied to avoid (избегать) the mistakes of the past.
6. In many cases the force that acts on the body to produce the motion is not directly discernible.
7. In ionization the outer (внешние) electrons leave the atom to form a positive ion.
8. The problem to be developed at our laboratory is pertinent to the question of accuracy.

9. The seminar to be held in a week will be devoted to the theory of the experiment.
10. The student to do the lab is to read its description in the manual.
11. Lobachevsky was the first to develop the principles of non-Euclidean geometry in 1826.
12. Johann Bernoulli was the first to introduce the concept of function in 1667.
13. Our aim is to express the idea in a concise form.
14. To propose a solution to this problem is to create a method of solving a whole class of problems.
15. His first success was to inspire him to further attempts.
16. It is to be mentioned that the theory stimulates experimentation and vice versa (наоборот).
17. The student has enough experience to distinguish clearly between random (случайный) and systematic errors.
18. Your hypothesis is too contradictory to be accepted (принимать).
19. This particular theorem was sufficiently complicated to be used in the Olympiad.

Ex. 2. Mind the difference in translating the Infinitive depending on the function.

A

Подлежащее (что?)	*Обстоятельство (для чего?)*
To analyze the above results is our aim. Проанализировать (анализ)…	To analyze the above results we shall use the previous experience. Для того чтобы проанализировать…
1. To start an experiment with a right idea is necessary for any experimenter. 2. To supply science with more precise measurements is a task	1. To start an experiment with a right idea a student should have some experience. 2. To supply the town with water they will have to start build-

of present-day technology.	ing a canal directly towards the town.
3. To make our work more effective was not easy.	3. To make our work more effective your interference was needed.
4. To encourage active contacts among scientists was the purpose of the last conference.	4. To encourage active contacts among scientists the international conference will be necessarily held this decade.
5. To develop a new technique requires a joint effort.	5. To develop a new technique more complicated equipment is required.
6. To continue our experiment in this direction is to repeat the mistakes of the previous investigators.	6. To continue our experiment we have to recall that the above effect is due to radiation.
7. To illustrate the above statement means to show a number of entirely new diagrams.	7. To illustrate the above statement a single example is not sufficient.
8. To make a contribution to science means first of all to discover a previously unknown phenomenon.	8. To make a contribution to science, it is sometimes necessary to spend years of intensive research (and sometimes in vain)

B

Глагол – связка	*Модальный глагол*
His aim was to set a new record. Его цель заключалась в том, чтобы поставить новый рекорд.	He was to set a new record. Он должен был поставить новый рекорд.
1. The purpose of his paper is to show that the change and progress go hand in hand.	1. The lecturer is to show that change and progress go hand in hand.
2. The object of physics is to give quantitative descriptions of nature.	2. Physics is to give quantitative descriptions of nature.
3. The task of a scientist is not only to explain well-known facts but also to make new predictions.	3. An English teacher is not only to explain grammar rules but also to illustrate them by examples.
4. The problem was to diminish the speed of the body.	4. The force of friction was to diminish the speed of the body.
5. The next step was to reduce the temperature of the transformer.	5. The assistant was to reduce the temperature of the transformer.
6. His intention was to stop the experiment due to inadequate conditions.	6. He was to stop the experiment due to inadequate conditions.
7. The task of the student is to exert every effort to become a good specialist	7. Every student of our Institute is to exert every effort to become a good specialist.
8. Another way to consider the effect of a force on a body is to study the effects produced.	8. Science is to study natural phenomena and find ways of their practical use.

Ex. 3. Replace the attributive clauses by the Infinitive.

Example:

The professor	*who will give* *to give*	*a lecture is here.*
That is not the question	*which must be discussed.* *to be discussed.*	

1. The problem which must be considered deals with the acceleration of free fall.
2. The difficulties that will be encountered later can be removed in either event (случай).
3. The diagram that is to illustrate this event has been discussed above.
4. In the galvanic battery the electric charges that are to be produced are equal and opposite.
5. Any action that will change a body's state of rest or its motion in a straight line is referred to as a force.
6. The method which must be followed by the students is sufficiently complicated.
7. There are instructions that are to be followed by any experimenter.
8. Heating (нагревание) which will be followed by cooling will change the structure of the substance entirely.
9. Any student who will follow these recommendations must obtain accurate results.

FOR–PHRASE

Ex. 4. Translate into Russian. Mind the translation of the for–phrase.

1. For the train to move in the forward direction the locomotive supplies a force.
2. Certain changes were introduced (вводить) into the design of the device for its weight to be diminished.

3. For the energy level of an atom or a molecule to be changed, the energy needed must be equal to the difference in energy of the levels.
4. The task is too complicated for one to be able to solve it.
5. The tendency is for a body to continue to move in a straight line when it is not acted upon by a force.
6. It is for you to know that programmers invented modern techniques of their own that are elegant and powerful (мощный).
7. It is important for him to find the error in the final results.
8. It is necessary for the experimenter to estimate (оценить) the magnitudes of the errors in each part of the experiment.
9. It is possible for the phenomenon of resonance to be due to geometric properties of space itself.
10. The best thing for you to do is to recognize your failure at the exam.
11. This is not a book of problems (мат. задача) for you to solve but rather a collection of beautiful mathematical ideas for you to enjoy.

Ex. 5. Translate into Russian. Mind the meanings of 'for'.

Example: The temperature must be high for the reaction to take place.

Температура должна быть высокой, для того чтобы произошла реакция.

The temperature is high, for the reaction is taking place.

Температура высокая, т.к. происходит реакция.

1. Some force is required for a body to be set in motion.
2. Now the kinetic energy of the body isn't equal to zero, for the body has been set in motion.
3. For the results of Michelson–Morley experiment to be explained Einstein developed the first part of his theory.
4. It is possible for the gas to be removed from the lamp with the help of chemical reactions.

5. Each book of the new Mathematical Library includes problems, for the best way to learn mathematics is to do mathematics.
6. It is easy for them to confirm their postulates, for they know the fundamental laws of physics.
7. The exercises are sufficiently elementary for the students to understand and enjoy.
8. It makes no difference which term to choose, for the acceleration of free fall is often called the acceleration due to gravity.
9. For the temperature to be reduced it is necessary to increase the volume (объем) of the gas.
10. The efforts of many researchers have not been in vain, for they have led to the revision (пересмотр) of our earlier concept of nuclear matter.
11. For the magnitude of acceleration of free fall to be determined at any point you must not necessarily measure it, you may consult the table, it equals 9.80665 ms^{-2} in Europe.

THE EMPHATIC CONSTRUCTION: *IT IS ... THAT, WHO, WHICH*

Ex. 6. Translate into Russian.

1. It is a high level of radioactivity that shows: there are radioactive elements in a substance.
2. It is at the velocity of light that all electromagnetic radiation travels in a vacuum.
3. It is just for this reason that Newton introduced the concept of absolute space.
4. It is in this way that vector symbols can be readily distinguished from scalar symbols in reading.
5. It was Pierre Herigone who first used the symbol ∟ for angle in 1634.

6. The force acting on a moving charge in magnetic and electric fields is given by $F = q\,(E+[v \cdot B])$. It is the magnetic contribution to the force that is called the Lorenz force.

Ex. 7. Translate into Russian.

1. To push a heavy block is not easy.
2. To analyze this case we must treat the previous one.
3. To produce the motion some force is required.
4. The problems to be considered in our analysis are very complicated.
5. The law to be stated and discussed is very complicated and sufficiently important to be treated once more.
6. The speed to be reduced is great.
7. The rules to obey were written on the notice-board.
8. His aim was to analyze this new relationship.
9. His wish is to make an independent research.
10. The situation encountered is too complicated to explain it in detail.
11. Mendeleyev was the first to recognize the dependence of the properties of the elements upon their atomic weight.
12. These forces are too small to oppose the action of the frictional forces.
13. For a body to remain at rest the resultant of all the external forces must be equal to zero.
14. For the reaction to take place the temperature must be increased.
15. The first thing for you to do is to compare the results of the calculations.

Ex. 8. Translate into English.

1. Мы увеличиваем силу трения, чтобы уменьшить скорость.
2. Чтобы произвести ускорение, мы прикладываем некоторую силу.
3. Вот новые идеи, которые надо развить в этой работе.

4. Эффект, который нужно устранить, обусловлен силой трения.
5. Примеры, которые надо будет проиллюстрировать, представляют огромный интерес.
6. Задача состоит в том, чтобы проанализировать предыдущие случаи.
7. Цель вышеприведенных примеров состоит в том, чтобы показать действие магнетизма.
8. Ньютон первый сформулировал три закона движения.
9. Для того чтобы выполнить эти требования (to meet the requirements), им пришлось дать более глубокий анализ выполненной работы.
10. Принципы, которые должны лечь в основу (to underlie) работы прибора, знакомы всем студентам.
11. Чтобы избежать ошибок, давайте изменим условия эксперимента.
12. Цель моей беседы с преподавателем состояла в том, чтобы уменьшить количество ошибок.
13. Для того чтобы эти условия были выполнены (to fulfill the conditions), давайте обратим внимание на предполагаемые ошибки.
14. Известно, что сила (действующая) на заряженную частицу не зависит (to be independent of) от скорости частицы.
15. Вам необходимо много работать, чтобы хорошо овладеть английским языком.

COMPLEX OBJECT

Ex. 1. Translate into Russian. Pay attention to the Complex Object.

Example: *I know him. – Я знаю его.*
I know him to support a new theory. – Я знаю, что он поддерживает новую теорию.

1. All engineers know it.
   All engineers know it to be the case due to inaccurate measurements.
2. He proved the theorem.
   He proved the hypothesis to be correct.
3. The scientist found a new quantitative description of the phenomenon.
   The scientist found a new quantitative description of the phenomenon to be more fruitful in this case.
4. They calculated the total force.
   They calculated the total force to be equal to zero.
5. A barometer shows atmospheric pressure.
   The barometer shows the atmospheric pressure to fall.
6. We don't believe this statement.
   We don't believe this statement to be the only one.
7. In the first case the experimenters expected a high speed.
   In the first case the experimenters expected a high speed to be detected.
8. The author considered an alternative concept.
   The author considered an alternative concept to contradict (противоречить) the initial one.
9. Let us take the potential energy of a body as an example.
   Let us take the potential energy of a body to be equal to zero.

Ex. 2. Translate into English using the Complex Object and the English equivalents.

Я знаю, что	– он поддерживает наше предложение – этот элемент встречается в природе – студенты решат эту задачу – ученые обратят внимание на эту работу – она интересуется биологией – он пренебрегает своими друзьями – они установят новое оборудование в лаборатории.
	– to pay attention to his work – to support our suggestion – to be interested in biology – to solve the problem – to place new equipment in the laboratory – to occur in nature – to disregard his friends
Я полагаю, что	– ваш пример устранит все сомнения – это имеет место (происходит) при высоких скоростях – Вы придерживаетесь тех же взглядов – отрицательные результаты обусловлены недостаточной точностью аппаратуры – температура останется постоянной – эти два явления имеют одну общую характеристику – инженеры будут возражать против вашей схемы – Иванов подготовит интересный доклад об этом ученом
	– to take the same views – to remain constant – to prepare an interesting talk on the scientist

	– to remove all doubts – to have one characteristic in common – to be due to inadequate accuracy of the equipment – to oppose your scheme – to be the case at high speeds

Ex. 3. Translate into Russian. Pay attention to the Complex Object.

1. Physicists know the wheel of the moving locomotive to have two kinds of motion, one of rotation, the other of translation.
2. Owing to spaceships scientists now know the power of X-rays of the sun to be extremely large.
3. I believe it to be the best way in which travel time to the far planets may be reduced.
4. Hertz showed the electric waves as well as light waves to possess many properties in common.
5. Experience shows ions with two or more charges to occur, though they are less common than those with only one charge.
6. He has found the procedure to be similar to that applied in common practice.
7. In a rigid body we find the distance between every pair of particles to remain constant under the action of any force.
8. One might expect him to represent the past events in a new light.
9. In addition the author assumed the biological event to be associated with X-rays.
10. Let us assume the adjacent sides of a parallelogram to be vectors, then its diagonals will represent the vector sum.
11. Newton regarded light to be a stream (поток) of particles moving in a straight line.
12. Newton considered momentum to be the measure of quantity of motion.

13. Hertz supposed electromagnetic waves to be identical to light waves and set himself a task of confirming that experimentally.
14. Our effort to prove this to be the case was in vain.
15. Nevertheless we can prove the procedure to bear the test of time.
16. His experience doesn't allow him to accept her view on the problem.
17. The device enables the effect of these forces to be reduced to zero.
18. We think the latest examination to enable one to define the conditions of the experiment.
19. This book will enable the beauty of geometry to be recognized.
20. There are two mechanisms which permit the particle to move across even in a uniform magnetic field.
21. Additional heating may cause the reaction to proceed (to run) violently.
22. The force which can cause an electron to move is the force owing to the field of other electrons.
23. New experimental conditions made this reaction run at reduced pressure.
24. These devices unlike batteries or generators are simply devices which can make electricity (that is electrons) move in an electrical system. They never produce electricity.
25. Some substances, for example glass, let light pass through them more easily than heat waves.
26. The gravitational forces do not let the planets leave the solar system.
27. Laser devices will make it possible to build extremely fast computers.
28. The new laboratory techniques make it possible to simulate (моделировать) some conditions of space flights.

Ex. 4. Translate into English. Use the Complex Object.

1. В этом случае мы хотим, чтобы Вы не принимали в расчет внутренние силы, т.к. они малы.
2. Мы знаем, что инерция есть свойство присущее всем телам.
3. Давайте допустим, что скорость поезда уменьшилась.
4. Я нахожу, что это изменение связано с уменьшением скорости.
5. Тем не менее, нам бы хотелось, чтобы вы обогатили свои знания в этой области.
6. Мы полагаем, что приложенная сила предотвратит уменьшение скорости.
7. Преподаватель хочет, чтобы мы изменили свою точку зрения.
8. Он доказал, что в некоторых случаях эти выражения будут сведены (to reduce) к простой форме.
9. Более того, это заставило меня увеличить мощность компьютера и ввести ряд сложных операций.
10. Что заставляет Вас подписать контракт, который никогда не будет выполнен?
11. Я нахожу эту проблему достаточно важной, чтобы рассмотреть ее немедленно.
12. Считаете ли Вы новый подход (approach) к проблеме более точным в данном случае?

COMPLEX SUBJECT

Ex. 1. Translate into Russian.

1. This example is considered to be analogous to the previous one.
2. They are supposed to complete this experiment no matter how much time it will require.
3. Their discussion is assumed to be restricted to the case of the work done by a variable force.

4. The situation is known to change unless the force has a component in the direction of the displacement.
5. His work appears to be devoted to the qualitative analysis.
6. This method does not seem to give the expected results.
7. Measurements of the angle with respect to the direction of the displacement proved to be difficult.
8. The accuracy of the calculations turned out to be poor.
9. Such a reaction is likely to accompany this particular process.
10. He is unlikely to use this convenient procedure.
11. The reduction in speed is certain to be due to the force of friction.
12. This situation is sure to occur at very high temperatures.

Ex. 2. Mind the translation of the verb 'to prove'.

Example: We proved the technique to be wrong – Мы доказали, что этот метод неправильный.
The technique proved to be wrong. – Как оказалось, этот метод неправильный.
The technique was proved to be wrong.- Было доказано, что этот метод неправильный.

1. He proved this method to be more convenient.
   This method proved to be more convenient.
   This method was proved to be more convenient.
2. We proved the potential between the plates to be constant.
   The potential between the plates proved to be constant.
   The potential between the plates was proved to be constant.
3. He proved the force exerted to be equal to zero.
   The force exerted proved to be equal to zero.
   The force exerted was proved to be equal to zero.
4. Newton proved the force to be the product of the mass of a body by its acceleration.

The force proved to be the product of the mass of a body by its acceleration.
The force was proved to be the product of the mass of a body by its acceleration.

Ex. 3. Translate into Russian. Mind the form of the Infinitive.

1. Most of the matter in the Universe is supposed to exist within galaxies.
2. Greek civilization is known to have existed for centuries.
3. War is sure to stop the progress of civilization.
4. The formation of the galaxies is likely to have stopped throughout the Universe billions of years ago.
5. This hypothesis is believed to be confirmed by a series of experiments.
6. Our hypothesis is certain to have been confirmed by a series of experiments.
7. Super heavy elements with atomic number higher than 114 are expected to be produced in the future.
8. A heavy element with atomic number 109 is reported to have been produced in West Germany.

Ex. 4.Translate into Russian. Mind the translation of *as, since, for.*

1. Astronomers were able to obtain more precise data since they lifted astronomical instruments into space.
2. Since there is a relationship between these two variables, it can be represented graphically.
3. As the chapters are really independent, they may be read in any order.
4. It is difficult for a specialist in one field to understand the terminology of another field, as rapid changes in a field lead to a rapidly changing vocabulary.
5. Their treatments of the particle's motion do not coincide (совпадать), for they have used different observational techniques.

6. You are familiar with such forces, for they are involved in the problems dealing with the direction of the winds.
7. For the assumption to be correct it is necessary that the interaction between the different plasma constituents be negligible.
8. The acoustic microscope is believed to find its place along with the optical microscope, for it has already begun to yield images that may be obtained with conventional light microscopes.
9. For new materials the corresponding curves might be readily calculated.
10. We must perform a series of conversions for the equation to be simplified.
11. The current inflation rate is a cause for concern.
12. The system operates without a malfunction (сбой, отказ) for all the initial conditions have been satisfied.

Ex. 5. Translate into Russian. Pay attention to the Complex Subject.

1. The atom was originally thought by Dalton to be indivisible.
2. Ether was once thought to fill all the space and to be extremely elastic.
3. The pressure exerted by a gas is shown by kinetic theory to be $\rho=1/3\ mnv^2$.
4. The increase of mass with velocity leads directly to the expression $E=mc^2$, where E is the energy associated with a mass m. Thus, mass is shown to be a form of energy.
5. Only 5 X-ray sources were reported to be clearly discernible in the photograph.
6. In reactions in which energy is carried by charged particles, the kinetic energy of the particles is known to be converted directly into the electrical energy.
7. If two electrical circuits (цепи) are connected in parallel, either one is said to be in shunt (parallel) with the other.
8. As the angles between these vectors are 90°, the scalar and vector products are expected to be either zero or one.
9. The pressure of the gas is observed to be continually increasing in magnitude.
10. Since these forces are all parallel, their resultant is believed to pass through a particular point fixed with respect to, but not necessarily on, the body.
11. The lens is supposed to have been located at some angle with respect to the object.
12. The initial conditions were not considered to have restricted the speed of the reaction.
13. SI units (Systéme International d'Unités) can be readily seen to make quite clear the relationship between a physical quantity and the units in which it is expressed.
14. The airplane in flight is assumed to encounter the analogous situation.
15. The illustrative method was found to be more convenient than the one used by other experimenters.
16. No explanation appears to be satisfactory enough to take his hypothesis seriously.
17. The present treatment of quantum mechanics does not seem to differ from the previous one.
18. Alpha particles which happen to approach very close to one of these nuclei are repelled (отталкиваться) in accordance with Coulomb's law.
19. In common usage the center of mass and the center of gravity prove to be synonymous, because when the latter exists, it coincides with the former.
20. The results of the studies of new qualitative concepts turned out to be even more confused.
21. Look around you and you are likely to see things made of a lot of different materials: metals, plastics, ceramics, glass, etc.
22. This supposed violation (нарушение) of the second law of thermodynamics has no material basis and is unlikely to occur.

23. As to the optical experiments the measurements are sure to be completed on time.
24. The experiments are certain to support the theoretical view that these two forces are aspects of the same force.
25. Mechanical equivalent of heat is taken to be a constant relating (связывать) the calorie to the joule and erg.

Ex. 7. Translate into Russian. Mind the functions of the Infinitive and the Infinitive Constructions.

1. To translate a sentence is to discover its meaning and to construct a new sentence in another language.
2. The next step is to multiply the current by the voltage provided that the current and the voltage are in phase.
3. His first plan was to accompany the lecture with tables. Then he substituted tables by slides.
4. Acceleration is to be treated as the rate of change of velocity with respect to time.
5. It is for this reason that the research program is to be completed no matter how much time it will take.
6. The reactor must be cooled in order to prevent an extremely high temperature of its core (активная зона).
7. In the previous text we introduced the science of optics qualitatively in terms of certain properties and concepts used to describe optical phenomena.
8. Any substance to accelerate a chemical reaction is called a catalyst.
9. The route (маршрут) to be followed by the expedition is associated with the events of the past.
10. The immediate results of the test are too obvious to disregard them in our analysis.
11. Wave fronts travel in a definite direction to form planes at right angles to the rays.
12. The reflections will add in phase to produce an appreciable amount of light when the mirrors are placed at the appropriate distance to each other.

13. It is necessary to refer to the kinetic theory of gases for the increase temperature to be ascribed to the change in speed of the molecules of a gas.
14. The particles (the neutron and the proton) are too small for their rotation to be observed directly.
15. One necessary condition for dissociation to occur is for the molecule to have sufficient energy to dissociate (диссоциировать).
16. In addition the information the astronomers gained enabled a map of a large area of the sky to be constructed.
17. We know cosmic rays to travel in space outside the atmosphere at speeds nearly equal to that of light, some of them happen to enter the atmosphere.
18. Using the principle of conservation of momentum we can calculate the velocity to be $V=m/M \cdot v$.
19. Thus the velocity was calculated to be $V=m/M \cdot v$.
20. From the point of view of physics speed and velocity are considered to have different meanings.
21. Velocity is known to involve magnitude and direction while speed is known to denote (обозначать) magnitude of the velocity which does not include direction. Now you are certain to distinguish speed from velocity.
22. There seems to be a number of errors due to inadequate accuracy of the apparatus.
23. A new analyzer appears to give a better quality of observing physical processes occurring in space.
24. Joule and other scientists proved heat to be a form of energy.
25. Complex processes of interaction of various particles turn out to be due to their quark structure.
26. The potential of the earth is taken to be the arbitrary zero in the scale (шкала) of electrical potentials.
27. No method is known to have provided a satisfactory solution of the problem except the Monte-Carlo method.

28. Faraday's law, as stated above, has been subjected to experimental tests and is found to be one of the most exact laws in physical science.
29. X-rays have been found to be waves of exactly the same nature as light but of small wavelength (длина волны).
30. The partial loss (частичная потеря) of the signal is likely to be due to refraction effects in the earth's atmosphere.
31. If the determinant of the equation system is not zero, the system is sure to have a single solution whatever the number of variables.
32. This hypothetical neutral delta particle is assumed to have a rest mass large enough to make it possible for the particle to be transformed into groups of particles of lower mass: mesons, electrons, neutrinos, etc.
33. Our recent clearer understanding of the fundamental properties of liquids is sure to be followed by better understanding of matters of direct interest in other sciences.

Ex. 8. Translate into English.

1. Известно, что этот метод очень плодотворный.
2. Считают, что его выводы сложны и запутаны.
3. Предполагают, что произойдет ряд важных событий.
4. По-видимому, его работа будет завершена летом.
5. Вероятно, его лекция будет сопровождаться кинофильмом. (to accompany)
6. Маловероятно, что это обсуждение изменит мою точку зрения.
7. Трактовка этого ученого оказалась правильной.
8. Несомненно, в этом случае тело будет двигаться под некоторым углом по отношению к земле.
9. Как известно, несколько различных единиц (измерений) используются для выражения работы.
10. Полагают, что по многим причинам будет использован этот надежный метод.
11. Эта система единиц оказалась простой и удобной в использовании.

12. Вряд ли он поддержит Вашу точку зрения.
13. Давайте допустим, что этот постулат (postulate) является следствием повторных измерений.
14. Ошибки в вычислениях, как оказалось, изменили траекторию полета.

Ex. 9. Translate into Russian. Mind the translation of the Infinitive and the Infinitive Constructions.

A

1. This invention belongs to a group of scientists. To ascribe it to one scientist is unreasonable.
2. To remove the restriction seems a difficult task.
3. To provide additional data some other mechanism should be used.
4. The immediate object of their work is to plan the experiment whose procedure is to be appropriate to that mentioned above.
5. Once you are not sure of the accuracy of your results, you are to repeat the measurements.
6. It is clear that everyone is to do experiments in the appropriate laboratories.
7. Thus a new problem to be solved immediately arose from their discussion.
8. The method to be followed in this case has already given good results.
9. The numerical value to be substituted for W is taken from the above equation.
10. The conclusion to be drawn here will depend on the results of the test.
11. In practice this method, though the simplest, is not used for the reasons to be given later.
12. Everyone knows him to be interested in the problem of law temperatures.
13. We expect the temperature of the gas to rise with respect to its former value.

14. As a result of a series of experiments we found the properties of these substances to be different under the same conditions.
15. The apparatus enables accurate measurements to be carried out with ease.
16. The procedure involved enables the calculations to be reduced.
17. Nevertheless, we could not make him change his point of view.
18. Certain conditions are required for him to reconsider his previous conclusion.
19. For a body to gain energy it must be acted upon by another object.
20. The conclusion for you to draw in this case is quite obvious.
21. It is necessary for the theory to be associated with practical applications.
22. In order for the process to occur the temperature must be sufficiently high.
23. It takes longer for the reaction to complete at low temperature.
24. It is impossible for one scientist to solve a problem which requires common efforts.
25. The atoms are known to become ions when they gain or lose electrons.
26. The work done in lifting a body is considered to increase its height with respect to its former position.
27. The word "atom" means "indivisible" and at the time this term was invented atom was believed to be the smallest unit. Though this is now known not to be the case.
28. His assumption seems to be groundless.
29. A body appears to tend to continue its motion in a straight line when for some reason it is necessary to make the body move in a circle.
30. This equation is unlikely to give us a physical meaning of temperature.

31. The initial value of the velocity turns out to be determined from the above equation.
32. In this case the temperature proved to have been taken arbitrarily.
33. If a device has a trouble it is sure to be substituted.
34. Strange laws of mechanics are proved to govern the Universe on the smallest scale.

B

1. To simplify the calculations is to avoid complications in the development of the future programs.
2. To utilize the theory of differential equations requires a certain amount of mathematical training.
3. In order to follow the particular method we are to utilize physical analogy rather than (a не) an electrical one.
4. The equilibrium is said to be kinetic or dynamic to distinguish it from static equilibrium.
5. The immediate object of this experiment was to relate the number of neutrons and their energy.
6. A small charge is to be used as a means of exploring the electric field.
7. The data to be received by the radar system may be presented in different ways.
8. The air in the region to be explored is assumed to act like a piston.
9. The subsequent chapter will describe in some detail the most important practical devices and the measurements to be made by them.
10. Coulomb was the first to conclude that the electric force obeys an inverse-square law.
11. This electric field is sufficiently high to cause ionization of molecules and atoms in the immediate vicinity of the electrodes.
12. For the masses of the size encountered in the laboratory experiments gravitational forces are not strong enough to be of practical use.

13. Because the photon has a zero rest mass it is possible for a physical system to contain many low-energy photons.
14. Thus it is not possible for a single virtual electron to appear in a vacuum; it must always be accompanied by a particle of opposite charge, the positron.
15. It should be emphasized that the contact must be close for the reaction to occur.
16. A gas will be called plasma if it is sufficiently highly ionized for it to interact with the applied electromagnetic fields.
17. We know various physical changes to be caused by heating.
18. The increase of temperature causes the electrons to move faster than their normal speed of motion.
19. They expected the acceleration to be different for different weights but this is not the case.
20. Maxwell found the speed of the motion of electromagnetic waves to be equal to the ratio of the electromagnetic to the electrostatic units of charge.
21. We are led to infer that the use of this gas enables the working potential to be increased to over 1000 volts.
22. The subsequent chapter describes a model which is too complicated to allow the effect of the inharmonic forces to be calculated.
23. The programs to make the machine perform a series of similar operations have not been written yet.
24. He proved the particles to obey the same laws which had been developed to describe the behaviour of a gas.
25. In this situation his method was proved to be the only possible one.
26. Complex numbers proved to be convenient in describing various physical phenomena.
27. The substances mentioned above are known to behave in a similar way without regard to their chemical composition.

28. A further reduction in pressure turns out to have given rise to the appearance of additional dark regions.
29. When a body is brought into contact with another body composed of a different material, the two bodies are expected to gain opposite charges.
30. It does not appear to be possible to attribute the appearance of the force involved to the magnetic field only.
31. The ratio of work to charge is likely to have been considered in the preceding chapter.
32. To avoid complications they are sure to utilize universally accepted definitions.

Ex. 9. Translate into English.

1. Мы не ожидали, что результаты будут такими очевидными (ясными).
2. Я полагаю, что позже вы снимете это ограничение.
3. Вот несколько примеров, на которые надо сослаться в статье.
4. Ускорение, которое получит тело, зависит от приложенной силы.
5. Величина, которую надо определить, может изменить результат.
6. Величины, которые надо использовать, совершенно произвольны (arbitrary).
7. Он первый выразил этот закон в форме уравнения.
8. Чтобы понять эту зависимость, очень удобно представить ее на рисунке.
9. Известно, что кинетическая энергия является скалярной величиной.
10. Изменение потенциальной энергии, несомненно, связано с изменением положения тела.
11. Лабораторная работа оказалась очень сложной.
12. Согласно этому закону мы можем предположить, что эти вещества имеют одинаковые свойства.
13. Следовательно, ученые считают сверхпроводимость аномальным (anomalous) свойством.

14. Основное условие эксперимента состояло в том, чтобы расположить щели (a slit) на равном расстоянии от источника света.
15. Можно предположить, что фотоны (photons) рассеяны на границах (boundaries).
16. Звуковые волны, как известно, распространяются в газе, в жидкости и в твердом теле (a solid).
17. Эта оптическая система позволяет определить показатель преломления газа.
18. Чтобы сделать изображение видимым, используется фотографическая пластинка (a plate).
19. Источники должны быть когерентными, чтобы производить хорошую интерференционную картину.
20. Томас Юнг первый наблюдал в 1801 г. интерференционные полосы (band).

PARTICIPLE

Ex. 1. Translate into Russian. Mind the difference in translating Participle I.

Example:

Approaching the target the rocket... - Приближаясь к цели, ракета...

The rocket approaching the target... - Ракета, приближающаяся к цели...

1. Converting electrical energy into mechanical one we lose part of the energy.
2. A motor converting electrical energy into mechanical one is represented in Fig.3.
3. A student has to describe the motion of the train considering only the external forces.
4. The paper considering an unlikely situation but not impossible is to be studied.

5. Referring again to Newton's law of mechanics let us concentrate our attention on the motion of the stream of particles.
6. The table referring one to the atomic weight of substance is called Mendeleyev's Periodic Table.
7. Following the trajectory concerned, the spaceship will complete its journey successfully.
8. The spaceship following the trajectory concerned has been provided with new equipment.

Ex. 2. Translate into Russian. Mind the difference in translating Participle I and II.

Example: The force exerted on a body will change... - Сила, приложенная к телу, изменит...

The engine exerting its force on a train will cause... - Паровоз, действующий силой на поезд, заставит...

1. Aerodynamists dealing with the atmosphere entry problem are to devote much time to flight trajectories.
2. Our aim was to treat atmospheric absorption dealt with in the latest issue of the journal.
3. All papers considering biological aspects of space flight will be presented at the symposium.
4. It is obvious that the phenomena concerned occur due to the Doppler effect.
5. Reactions involving more than one neutrino are generally extremely slow.
6. The nature of absorption depends on the substance involved.
7. Professor N. following a new analytical approach to the problem showed its importance as compared with that used thus far.
8. These compounds (смесь) may be prepared by the methods followed by our laboratory.
9. Mathematical analysis following the experiment provides better understanding of the events.
10. The path followed by a projectile is called its trajectory.

11. The theoretical development followed by the experiment concerns the collisions of light and heavy particles.

Ex. 3. Translate into Russian. Mind the translation of Participle II as part of the predicate and as an attribute.

Example: A force is needed to set a body in motion.- Необходима сила, чтобы привести тело в движение.

The force needed to set a body in motion is supplied by an external agent. – Сила, необходимая, чтобы привести тело в движение...

1. The symbol W is used in physics and denotes work.
2. The term 'work' used in physics has no direct relationship to that used in everyday experience.
3. In this case an unbalanced force is applied to a body and causes a substantial change of momentum.
4. An unbalanced force applied to a body will cause the change of momentum.
5. This dependence is often referred to in describing motion with respect to speed, time and distance.
6. The dependence referred to above describes three physical quantities: speed, time and distance.
7. The path of the meteorite was followed through the telescope.
8. The path of the meteorite followed through the telescope changed appreciably.
9. A simultaneous translation of the papers was provided at the congress.
10. The translation of the papers provided at the congress has not been published yet.

Ex. 4. Translate into Russian. Mind the translation of Participle II.

1. The methods introduced received general recognition.
2. The energy determined depended on the level of density.
3. The technique used simplified the processing of the data.
4. The impulse thus evaluated related the mass of the body to its velocity.

5. The theory involved allowed many questions to be answered.
6. The theory applied provided an accurate method of determining the atomic weight of any element.

Ex. 5. Translate into English. Mind the Verbal Forms as an attribute.

The problem to be considered (которую надо рассмотреть) The problem considered (рассмотренная) The problem being considered (рассматриваемая)	is rather simple
The method to be described The method described The method being described	gave good results

1. Величина, которую надо измерить...
2. Величина, измеренная...
3. Величина, измеряемая...

1. Опыт, который надо провести в этой лаборатории...
2. Опыт, проведенный в этой лаборатории...
3. Опыт, проводимый в этой лаборатории...

Ex. 6. Use the Participle instead of the subordinate clause.

A

Example: The equipment which is being used in a series of space flights is quite reliable.

The equipment being used in a series of space flights is quite reliable.

1. The model which is being treated as an example of a continuous wave was first proposed as a mathematical model.
2. We are familiar with the method of calculation which is being described here.

3. Let us consider the observations which are being made to confirm the theory.
4. Let's focus our attention on the complexity of the process which is being considered here.
5. The explanation which is being sought for by the scientists might be given in the near future.
6. We are not familiar with the deviations which are being caused by the change of temperature.
7. The new approach to the energy problem which is being referred to has proved to be constructive.

B

Example: When the theory was put into mathematical form it proved to be more beautiful.
Being put into mathematical form the theory proved to be more beautiful.

1. When equations of motion are used in high-energy physics they might yield good results.
2. As these values were obtained by different investigators they lacked uniformity.
3. As the devices are assembled in this manner, they might be applied to higher energies.
4. When the children are encouraged by their teacher, they turn more attention to school.

Ex. 7. Fill in the blanks with a proper form of the Participle.

1. The results _____ will confirm the original idea. (obtaining; having obtained; obtained; being obtained)
2. The material _____ is to be placed in the magnetic field. (examining; having examined; examined; being examined)
3. _____ the disadvantages of the system let us analyze their economic consequences. (discussing; having discussed; discussed; being discussed)
4. _____ a magnet loses some or all of its magnetism. (heating; having heated; heated; being heated)

5. The calculations _____ by the analysis of the experimental errors were made with precision. (following; having followed; followed; being followed)
6. _____ the experiment in other conditions the students obtained a three dimensional image. (being repeated; having repeated; repeating; repeated)
7. _____ by the snowstorm Jason missed the last train. (delayed; being delayed; having been delayed)

Ex. 8. Translate into Russian. Mind the Present Participle Construction.

1. While entering the upper atmosphere, charged particles excite (возбуждать) the air molecules causing an emission of light.
2. When using an oscilloscope, we can examine electrical signals visually.
3. When treating an impulsive force, students should know that it is very large but acts for a very short time.
4. A gas molecule while striking a rapidly moving molecule may be given a high velocity.
5. While accelerating in a strong electric field, each electron and ion gain sufficient energy to ionize other molecules.

Ex. 9. Change the time clause into the Past Participle Construction with and without 'when'. Mind the translation.

Example: When a particle is acted on by a force, it will be accelerated.
When acted on by a force, a particle will be accelerated.
Acted on by a force, a particle will be accelerated.
Когда на частицу действует сила, она ускоряется.

1. When the spaceship is acted on by an appreciable external force, the momentum of the ship remains constant.
2. When liquid air is subjected to strong cooling under high pressure, it has a blue colour.
3. When Dirac function is used in dynamics, it serves to represent an impulse.

4. When these symbols are applied to an electric circuit, they show the presence or absence of a pulse in it.
5. When two additional quantum numbers were introduced in Sommerfeld's theory, they further improved (улучшать) the theory of the atom.
6. When the temperature of a body is measured by a special device (a radiation pyrometer), it is appreciably less than the true temperature of the body.

Ex. 10. Translate into Russian. Mind the Past Participle Construction.

1. Rockets carry both their own fuel and oxidant (окислитель) if required.
2. Two corresponding spectral colors when mixed produce white light.
3. Until tested in practice, a device cannot be produced in a large amount.
4. Until checked the results cannot be included in the paper.
5. Unless surrounded by a massive structure, a nuclear reactor is dangerous for people.
6. Unless calibrated the galvanometer will not be adequate for the present purpose.
7. Unless designed with high precision, the instrument is incapable of measuring small changes of the voltage.
8. Once converted into liquid, oxygen will remain in its liquid state under appropriate conditions.
9. Though known since the 18th century, Fermat's theorem has not thus far been proved.
10. The principles of quantum mechanics which are applied to microscopic systems must give the same results though applied to large systems.
11. The magnetization of a ferromagnetic substance when acted on by the magnetic field neither increases nor decreases steadily with steady increase or decrease of the field.

12. Given the atomic weight and the density of the solid body, you divide the atomic weight by the density and obtain the atomic volume.
13. In the table, unless otherwise stated, the values are at 18°C, so that the calculations should be made with regard to this temperature.

Ex. 11. Mind the difference in translating the Past Participle.

Example: Newton's second law expressed in the form of an equation would read... – Второй закон Ньютона, выраженный в форме уравнения...

Expressed in the form of an equation, Newton's second law would read... – Если второй закон Ньютона выразить в форме уравнения, то он...

1. This mathematical problem considered from another point of view turns out to be quite simple.
2. Considered from another point of view this mathematical problem turns out to be quite simple.
3. A body placed in a fluid displaces a weight of fluid equal to its own weight.
4. Placed in a fluid a body displaces a weight of fluid equal to its own weight.
5. A compound nucleus formed immediately after a nuclear collision has a short lifetime.
6. Formed immediately after a nuclear collision a compound nucleus has a short lifetime.
7. Equal volumes of all gases measured at the same temperature and pressure have the same number of molecules.
8. Measured at the same temperature and pressure equal volumes of all gases have the same number of molecules.
9. An atom subjected to an external magnetic field can have a number of different states.
10. Subjected to an external magnetic field an atom can have a number of different states.

Ex. 12. Translate into Russian.

1. Newton's second law expressed in a new form is true for bodies travelling at speeds approaching the speed of light.
2. If we know the number of particles striking the target in each second we can define the average rate of change of momentum.
3. Examining the substances we have seen that they continually change their properties.
4. Starting from the station the train is continually gaining speed.
5. A special type of motion encountered in many situations is that of vibration.
6. The average data obtained were compared with the original ones.
7. The results involved provided us with the values of the average rate of the reaction.
8. The problem dealt with in this chapter is that of quantum mechanics.
9. You will have to consider the concept referred to previously.
10. In this work he followed the method so much spoken about.
11. Friction produces heat, but the heat being produced by friction is considered as useless work.
12. The data being discussed now have already been published in various journals.
13. Being applied in biophysics his method contributed to better understanding of some events.
14. Being continually enriched with new inventions and discoveries the Russian science enables our country to solve the most complex problems.
15. Having received complete information about the methods used thus far we may plan a new set of experiments.
16. Having studied the substantial aspects of this problem we could treat the neighbouring problems connected with it.

17. Having been compared with the original results the data obtained could not be used.
18. Having been accelerated the body began to move at a speed determined by the above equation.

Ex. 13. Translate into English.

1. Если тело падает, оно получает кинетическую энергию, теряя в то же время потенциальную энергию.
2. Подставляя эти числа в уравнение, мы определяем среднюю силу.
3. В уравнении $F = dp/dt$ "p" это символ, обозначающий (to denote) количество движения.
4. В нашем эксперименте мы использовали прибор, превращающий тепловую энергию в электрическую.
5. Приложенное напряжение чрезвычайно высоко.
6. Полученные результаты обсуждались на конференции.
7. Какова средняя сила, приложенная к мишени (a target) со стороны мяча?
8. Введя новый термин, автор объяснил его физическое значение.
9. Получив новое вещество, ученый подверг (to subject to) его радиоактивному анализу.
10. Величины, измеряемые сейчас, очень важны для конечного результата.
11. Новый метод, используемый в лабораторной работе, поможет студентам уменьшить ошибки.
12. Силовые линии, возникающие на положительных зарядах, должны оканчиваться на отрицательные заряды.
13. Сравнивая теоретические и экспериментальные результаты, мы видим, что они находятся в соответствии друг с другом.
14. Представляя электрическое поле посредством силовых линий, мы концентрируем линии там, где напряженность выше.

15. Исследуя математическую модель процесса, они сделали интересные заключения.
16. Сила, испытываемая заряженным телом в покое (at rest), обусловлена наличием электрического поля в данной точке.

ABSOLUTE PARTICIPLE CONSTRUCTION

Ex. 14. Replace the Nominative Absolute Construction by a coordinate clause using *but, and.*

Example: We consider a stream of particles, each moving with velocity V.

We consider a stream of particles, and each moves with velocity V.

1. Both methods can be applied here, each having its own advantages.
2. Complex numbers have geometric representation, the horizontal axis representing real quantities, the vertical axis imaginary quantities.
3. A solid, liquid and gaseous substance can exist in two or more forms, they differing in physical rather than chemical properties.
4. There are various kinds of Bessel functions, the most important ones being denoted by *Jn(x).*
5. Gauss explained the properties of such optical systems in terms of certain constants, they now being called the Gaussian points or constants.
6. Only the most elementary theorems are in practice proved completely, all the rest being proved with the aid of other theorems already known.

Ex. 15. Replace the Nominative Absolute Construction by a subordinate clause using *as, since.*

Example: Other conditions being equal, the pressure remains constant.

As other conditions are equal, the pressure remains constant.

These two theories having a different range of predictive power, the simpler and more elegant is preferred.

Since these two theories have a different range of predictive power, the simpler and more elegant is preferred.

1. Classical mechanics being applied to a wide range of problems, it merits (заслуживать) careful study.
2. There being a lot of unexpected errors in the experiment, the teacher proposed another procedure.
3. All the results of the investigation having been confirmed by numerous tests, we could appreciate quite a new approach to the theory.
4. Silver being very expensive, we only rarely use it as a conductor.
5. The speed of light being extremely great, we cannot measure it by ordinary methods.
6. The accuracy of a new device having been estimated, further investigation is unlikely to be time-consuming.

Ex. 16. Translate into Russian. Mind the Nominative Absolute Construction.

1. The radio observation continuing, astronomers hope to receive a large amount of important information on the far regions of galaxies.
2. The design of the spaceship having been specified, the question of a life-support system arose.
3. An electron being emitted by the nucleus during beta-decay (распад), the number of nucleus protons increases by one.
4. Other conditions being equal, the higher the temperature of a gas, the larger its volume.
5. There being no external force acting in any fixed direction, the linear momentum in that direction remains constant.
6. The components of the velocity of a body moving in the air being known, the resultant velocity may be found.

7. The fission (деление) of a U^{235} nucleus is accompanied by the emission of one, two, or three neutrons, each being capable of causing further fission of U^{235} nuclei.
8. The amount of a substance is proportional to the number of specified particles of the substance, with the specified particles being an atom, molecule, ion, etc.
9. The base units of a system of units (such as SI) are an arbitrarily defined set of physical quantities, with all other units in the system being derived from the base units.
10. Angular displacement is the angle through which a point, a line or a body is rotated (переворачиваться), they being rotated in a specified direction and about a specified axis.
11. The charges produced by rubbing (тереть) together two unlike substances are equal and opposite, one of the substances becoming positively charged, the other negatively charged.

Ex. 17. Translate into Russian.

1. All gases occupying equal volumes at the same temperature and pressure contain equal numbers of molecules.
2. Maintaining a magnetic material in the field of another magnet, we can magnetize it to a certain degree.
3. Occurring only at high temperatures this reaction may under certain conditions take place at low temperatures.
4. The gas contained in a cylinder with a closely fitting piston was allowed to expand.
5. The data being referred to proved to have been taken entirely arbitrarily.
6. Being heated to a higher temperature the gas expands to a new volume.
7. Having analyzed various properties of the substance in detail the experimenter arrived at an entirely new conclusion.

8. Having found the pressure of a gas to be equal to 2 atm., we began to examine the volume, maintaining the pressure at the same value throughout the process.
9. Having been heated the substance changed its colour.
10. Having been tested the substance was found to be a good conductor.
11. Unless simplified the equation is not easy to remember.
12. The theorem, thus treated, is difficult to apply to the case involved.
13. The pressure being known at some point in the flow of air, the pressure at another point may be calculated from Bernoulli's law.
14. When determining the numerical value of the gas constant we note that 1 mole of any gas occupies a volume of 22.4 litres.
15. An isothermal process followed by a constant-pressure process is shown in the figure.

Ex. 18. Translate into English.

1. Зная, что давление и объем постоянны в течение всего процесса, давайте вычислим газовую постоянную.
2. Нагревая газ, мы увеличиваем объем.
3. Константа, появляющаяся в этом уравнении, не зависит от химической природы газа.
4. Первоначальное состояние газа, обозначенное индексом «i», является совершенно произвольным.
5. Изучив полученные результаты, мы обнаружили ошибку.
6. Рассмотрев поведение газа, содержащегося в цилиндре, давайте опишем его в форме уравнения.

Ex. 19. Translate into English using different forms of the Participle.

1. Физики, определяющие эту величину, много работают.

2. Определяя эту величину, они сделали несколько ошибок.
3. Величины, определяемые таким образом, обычно бывают точными.
4. Величина, определенная этим ученым, используется всеми физиками.
5. Величина, которая была определена, упоминалась в его статье дважды.
6. Величина, которая сейчас определяется, будет использована в будущих исследованиях.
7. Когда эта величина была определена, ее использовали в дальнейших расчетах.
8. Определив эту величину, ученые смогли вычислить некоторые другие величины.
9. После того как эта величина была определена, ее можно было использовать в наших исследованиях.

Ex. 20. Translate into Russian.

1. Only the substances withstanding heavy loading and high temperature are known to be used in the design of spaceships.
2. The equation relating the magnitude of impulse to the change in momentum can be derived with ease.
3. Following the least-square method we try to evaluate the inaccuracy of the experiment.
4. Subjecting materials to impulsive and steady forces one can observe the difference in their behaviour.
5. The forces disregarded proved to be appreciable.
6. The procedure followed in all our analysis turned out to be fruitful.
7. The insufficiency of the facts involved is soon to become obvious.
8. The questions being discussed in this chapter concern the results of the work done.
9. Being compounded of the same elements some substances can have different properties in different states.

10. Having added the changes in momentum due to each impulse we could find the overall effect of the impulse.
11. Having been inquired about the difference in the results they reported it to be appreciable.
12. If given as an arbitrary function of time the impulsive force can be determined by following the procedure of the integral calculus.
13. If given as a simple rectangular pulse the impulsive force can be easily evaluated.
14. Unless reduced to the algebraic system this equation may take a lot of time.
15. The graph of $F(t)$ shows a number of pulses of different heights, the total number being the area under the curve.
16. The electrons are surrounding the nucleus, their actual number depending upon the atom being considered.
17. We know the velocity of a particle to be continuously changing if the motion of the particle is nonuniform, the particle gaining some increment of velocity each next interval.
18. No appreciable forces acting on a spaceship over the major portion of its path, the momentum of the ship will remain substantially constant.
19. Work and torque being compounded of the product of a force by a displacement, we can express them in the same units.

Ex. 21. Translate into English.

1. Сила, действующая на предмет, увеличивается на небольшую величину каждую секунду.
2. Используя интегральное исчисление (integral calculus), можно вычислить площадь любой фигуры.
3. Они сделали несколько дополнительных опытов, применяя тот же метод.
4. Явление, наблюдавшееся этим физиком, уже обсуждалось на конференции.

5. Закон, представленный в этом уравнении, справедлив для многих проблем механики.
6. Сравнив свои наблюдения, они смогли оценить точность эксперимента.
7. Написав уравнение, мы показали математическую зависимость между этими величинами.
8. Под действием (to be subjected to) низких температур материалы становятся хрупкими.
9. Сейчас мы рассмотрим оптическую систему, фокусирующую изображение перед второй системой.
10. Повторяя опыт в других условиях, студенты получили трехмерное изображение (a three dimensional image).
11. Смоделировав условия реакции, мы пришли к правильным выводам.

REVISION

PASSIVE VOICE, MODAL VERBS, INFINITIVE, PARTICIPLE

Ex. 22. Translate into Russian:

1. In this case random motion of particles is only slightly affected by temperature changes.
2. This particular problem can be approached only by methods of modern atomic physics.
3. The main reports were preceded by some introductory remarks.
4. A qualitative examination of an organic compound is followed by a quantitative analysis.
5. To construct a theory of an ideal gas we may assume that the molecules do not exert forces on each other except during collisions.
6. To predict the future of physics is a complicated task: such predictions may turn out to be quite incorrect.

7. The figures to be represented in the paper will give us a general idea of the amount of work done in the past few years.
8. In any event the procedure we are to follow will reduce the number of errors.
9. The first thing for better understanding of a chemical reaction is to determine the formulas of the compounds involved.
10. Regardless of the fact that the results obtained were the same the scientists had to repeat the experiment.
11. The methods used thus far are to result in a considerable loss of energy.
12. For the pressure of a gas to be calculated let us assume the impact of a molecule with the walls of a container to be perfectly elastic.
13. We must perform a series of conversions for the equation to be simplified.
14. It should be noted that the initial condition for the system to be stable has already been satisfied.
15. The moon may have been so close to the earth (within three or four earth radii) that the cooling lunar rocks were magnetized by the earth's field.
16. Tremendous amounts of energy must have been transmitted to the surrounding interstellar medium in the form of explosive shock waves.
17. It is usual for any new technique to be preceded by other related techniques.
18. All material substances are regarded as compounded of 92 different kinds of atoms.
19. The mean kinetic energy of a translational motion of the molecules of a gas has been found to depend on the temperature of the gas only.
20. Heat absorbed by a liquid causes the liquid to expand.
21. On the other hand, we find the observed results to follow directly from Einstein's description of the photoelectric effect.

22. The experimental results described in the preceding chapters are proved to be in good agreement with the theory of an ideal gas.
23. The molecules of a gas proved to be sufficiently far apart to interact with each other.
24. It was Lenz who proved the heat produced in a given time to be proportional to the square of the current.
25. If the forces do not tend to increase or to decrease the displacement, the body is considered to be in equilibrium.
26. Being far apart the molecules of a gas rarely interact with each other.
27. Accepting a number of assumptions one may construct a pattern of the interactions of particles.
28. Being composed of molecules and atoms material substances can be described in terms of their atomic structure.
29. The neutrons satisfying these conditions are known to be thermal ones.
30. On close examination of a piece of the substance we find it to be composed of several kinds of minerals having different degrees of hardness and different colours.
31. The operations being performed by a computer are known to be called instructions.
32. Having accepted these laws, we can predict many things about the union of chemical elements.
33. Having been compressed the gas returned to its original volume as soon as the applied force was removed.
34. There being a close condensation of molecules in a liquid, the molecular collisions occur much more frequently there than in a gas under the same conditions.
35. The dimensions of the detail having been slightly changed, its production was simplified.
36. According to the molecular-kinetic theory the molecules collide with one another and change their direction, the speed of molecular motion greatly depending on temperature.

37. Unless acted upon by some external force, a body at rest and a body moving in a straight line with constant speed will remain in a state of rest or motion.
38. The trouble, once removed, is unlikely to appear again.

Ex. 23. Translate into English.

1. Для того чтобы определить физические свойства вещества, необходимо знать строение атома.
2. Цель предыдущего опыта заключалась в том, чтобы показать поведение газа в различных условиях.
3. Наша задача заключается в том, чтобы ввести новый член и упростить уравнение.
4. Компоненты скоростей, которые надо сложить (суммировать),дадут среднюю квадратичную скорость.
5. Мы считаем, что теоретические и экспериментальные результаты находятся в соответствии.
6. Считают, что масса вещества численно равна его молекулярному весу.
7. Известно, что вес одного атома зависит от числа протонов и нейтронов.
8. Первое предположение оказалось верным независимо от химической природы газа.
9. Доказано, что кинетическая энергия является результатом поступательного движения молекул.
10. Создавая теорию идеального газа, давайте сделаем несколько простых предположений.
11. Сталкиваясь друг с другом, молекулы теряют энергию в этих неупругих соударениях.
12. Электрон, движущийся по орбите, проявляет свойства магнита.
13. Закон, выведенный в форме уравнения, описывает поведение частиц.
14. Газ, нагретый до более высокой температуры, расширяется до нового объема.
15. Выполнив ряд вычислений, мы смогли построить новую теорию.

Ex. 24. Translate into Russian. Pay attention to the attributive clauses joined asyndetically.

Example: The force that (which) the bat exerts against the ball is zero.

The force the bat exerts against the bat is zero.

This is the atom Bohr built	Вот атом, который построил
This is the nucleus	Бор.
That sits in the atom Bohr built	Это – ядро,
	Которое в центр помещено
	Атома, который построил
	Бор

1. The steady pressure these waves exert on a surface is called the radiation pressure.
2. In an elastic collision the energy one particle loses is kinetic, the energy a second particle gains is kinetic, the energy of excitation (возбуждение) or ionization.
3. The curve we see on the graph relates the current to the applied potential difference.
4. The relatively high temperature the scientists observe in the stratosphere is due to absorption of ultraviolet radiation by ozone.
5. The science (colorimetry) I am interested in specifies and reproduces colours as a result of measurement.
6. While glass withstands high pressure, it isn't capable of withstanding the impulsive force a falling stone exerts on it.

Ex. 25. Translate into Russian. Mind the translation of the word *that (those).*

Example: The speed of the electron at high temperature is faster than that at low temperature.

Скорость электрона при высокой температуре выше, чем скорость при низкой температуре.

The examples you are giving now aren't so illustrative as those given yesterday.

Примеры, которые Вы даете сейчас, не такие наглядные, как примеры, которые были даны вчера.

1. The space program compared to that applied so far provides the possibility of extending the research by placing the radio telescope beyond the ionosphere.
2. The laser has a line width of the order of 10^4 hertz. This is sure to be much narrower than that of other radio sources, the best monochromatic beams having a linewidth between 10^8-10^9 hertz.
3. The line of force is taken to be an imaginary line whose direction at many points along its length is that of the electric or magnetic field at those points.
4. Having been evaluated, the altitude of the star was compared to that of the sun.
5. The income taxes of the director of the company are much higher than those of the employees.

GERUND

Ex. 1. Mind the difference in translating the Gerund and the Participle at the beginning of the sentence.

Participle	Gerund
Example:	
Accelerating the particles we direct them…	Accelerating can be produced by means of…
Ускоряя частицы, мы …	Ускорение можно произвести …
1. Discussing the concept of work in the preceding chapter we derived the relationship between the joule and erg.	1. Discussing the concept of work is the subject of the subsequent chapter.

2. Representing the electric field by means of lines of force we may consider the interaction of two charges.	2. Representing the electric field by means of these lines helps us to imagine the forces between the charged bodies.
3. Converting mks to cgs units of length don't forget to divide them by 100.	3. Converting mks to cgs units is unnecessary in using Newton's laws.
4. Revolving (вращаться) around the nucleus the electron avoids falling into the nucleus.	4. Revolving prevents the electron from falling into the nucleus.
5. Being in the same orbit two electrons would take a definite position.	5. Being at rest means V=0. Thus we cannot imagine an electron being at rest.
6. Proving the correctness of the results they had to perform an infinite number of operations.	6. Proving the correctness of the results is considered to be a part of the experimental procedure.

Ex. 2. Translate the ing-form of the verb depending on its function.

1. Dealing with ultimate (элементарная) fundamental particles we encounter philosophical difficulties.
2. Measuring will not take long, provided it is carried out successively.
3. Forming molecules H_2 when the electrons have spins of the same direction is impossible.
4. Being of the same origin the effect has nothing to do with the magnetic interaction at all.
5. Introducing even a small amount of impurity (примесь) causes the reaction to change its rate.
6. Raising the temperature of the sample (образец) to the melting point successively, watch closely the readings of the ammeter.

Ex. 3. Translate into Russian. Mind the translation of the Gerund with the preposition.

1. In considering the theory of an ideal gas we made a few simple assumptions.
2. In working with a reactor an engineer must be able to come to an instantaneous decision.
3. On dropping from an upper to the ground state the electron loses its energy which is radiated as light.
4. On passing the ionization chamber (камера) the gas becomes ionized.
5. By applying the principle of relativity to the theory of the electron Dirac derived spin.
6. Pierre Simon de Laplace based an entire theory of probability on combinatorial analysis by defining probability as $\rho=n/N$.
7. One can apply the above principle without violating the energy conservation law.
8. Photons with opposite spins often seem to pass through each other without interacting at all.
9. Through connecting a new element to the circuit he prevented the voltage drop.
10. Through abbreviating some terms we made the particular diagram more illustrative.

Ex. 4. Before translating the sentence find the subject.

Example: Because of being simple the method is widely used.
Потому что (из-за того, что) этот метод простой, он широко используется.

1. Apart from performing numerous arithmetic operations a computer stores (хранить, запоминать) numbers.
2. Apart from being the 'atom' of electricity, the electron is a constituent of every atom of every element.
3. Besides being small in size the transistor is relatively light (легкий) in weight.
4. In addition to possessing charge and mass the electron is endowed (наделять) with spin.

5. In addition to constituting the starting point of the entire science of mechanics, Newton's definition of inertia is used to describe all electric, magnetic and gravitational forces.
6. In spite of being compressed the gas returns to its original volume as soon as the applied force is removed.
7. In spite of being theoretically attractive your treatment throws no light on the evolution of neutron stars.
8. Because of generating a substantial amount of heat the vacuum tube (лампа) had a limited operating life in the early computers.
9. Owing to operating at or near room temperature the new device is more practical.
10. Due to consuming little power the experimental device is more practical.
11. Instead of calculating the individual values of K at each time interval a graphical method may be applied to cover (охватывать) the whole of the reaction period.
12. In future computing devices the signals, instead of being transmitted by electric current, will be transmitted by means of laser radiation.

GERUNDIAL COMPLEXES

Ex. 5. Find the Gerundial Complex. Translate the sentences into Russian.

Example:

His The student Smirnoff's	being absent is quite natural.

То, что он (этот студент, Смирнов) отсутствует...

1. The device being expensive prevents its mass production at present.

2. The ocean being the major immediate source for CO_2 in the air is necessary to know for studying the ocean's role in the carbon cycle.
3. Carbon dioxide (CO_2) increasing in the earth's atmosphere resulted from man's activities.
4. Mankind consuming more and more energy results in increasing atmospheric CO_2.
5. The cosmonaut being isolated after the flight is done to avoid the risk of falling ill.
6. The mean global (общий) temperature being increased by 2.5°C by the middle of the next century was predicted by mathematical models.
7. Ampere's having introduced the highly suitable terms 'electrostatics' and 'electromagnetics' is known to those who are interested in the history of science.
8. Their having developed an experimental version (вариант) of the optical transistor is an important step in constructing optical computers in the relatively near future.
9. The temperature having risen on the earth led to some melting of the polar ice and a rise in the sea level.
10. Changes in the earth's magnetic field can result in long-distance radio communication being disturbed.
11. Superconductivity results from the behaviour of the conduction electrons being changed in the material at low temperature.
12. The passage of an electric current through a gas depends on ions being present in the gas.
13. Continents and oceans mainly differ in their crust (кора) having different thickness. The continental crust is from 20 to 70 kilometers thick, the oceanic crust is about 6 km thick.
14. Roughly speaking the presence of spin is attributed to the electron revolving around its axis.
15. Reasons of the sun's magnetic field being highly variable are still poorly understood.

16. Furthermore both theoretical results and new experimental data support the possibility of pulsars being neutron stars.
17. There is no universally accepted explanation for the temperatures of the past (millions years ago) being higher.
18. From the point of view of the earth scientists (who study the earth) our planet probably should be called Ocean rather than Earth because of 70% of it being covered by water.
19. Due to light having some of the characteristics of a wave and some of a particle, sometimes the wave description is more appropriate and sometimes the other.

Ex. 6. Translate the sentences paying attention to the Gerund.

1. Specifying the energy of a vacuum requires the solution of some delicate questions in quantum field theory.
2. Combining these two laws results in the relationship which is true for many cases.
3. (The strong equivalent principle). The principle states that being at rest in a gravitational field is equivalent to being at rest in an accelerated coordinate system.
4. The aim of our lab is relating current to applied p.d. (potential difference) for a given separation (расстояние) of electrodes in a gas at a particular pressure.
5. Ohm succeeded in showing that the electrical current in any conductor is proportional to the potential difference between its ends.
6. One cannot utilize this device for measuring temperatures without disturbing heat distribution.
7. Through performing a great number of calculations both he and his colleagues obtained the results often referred to.
8. On receiving new information you will be able to predict subsequent events.

9. Upon being cooled below a transition temperature, Tc (close to absolute zero), some substances have negligible electrical resistance.
10. Enrico Fermi formulated the first model of the weak interaction in 1933 and this model has proved successful in describing low-energy weak interactions to this day.
11. It is worth while emphasizing, however, that the earth's magnetic field must be continuously maintained or regenerated by the fluid motions within the earth's core (ядро).
12. This conventional technique provides a means of producing ultra low temperatures. It is worth trying.
13. A second year student cannot help knowing that the current density (j) is the ratio of the current to the cross-sectional area of the current-carrying medium.
14. You couldn't help noticing that reducing the size of the device reduced considerably the power consumed.
15. It is no use applying the reciprocal theorem (of Maxwell) unless a system is elastic.
16. It is no good plotting a graph without performing necessary computations.
17. Our galaxy extending well beyond the position of the sun is proved by astronomers.
18. The number of neutrons in the atomic nucleus being variable has no influence on the electronic structure.
19. The choice of the sign in the inequality of Clausius essentially depends upon the process being reversible (обратимый).
20. The corona of the sun is highly ionized. It results in its being an excellent electrical conductor.
21. The above measures prevent the particles from leaving the interaction zone.
22. The inventor's failure has resulted from the theory being inadequate to his purposes.
23. In addition to being utilized to measure the wavelength of various colours of light, Fabry-Perot interferometer is used for many other purposes.

24. Owing to the forces of attraction between the molecules of an ideal gas being negligible, the work in separating these molecules is equal to zero.
25. Because of being able to increase or decrease the voltage, the current transformer is used to extend the range of a.c. instruments.
26. In considering a fluid motion with respect to solid walls the frictional forces at a large distance from the walls can be disregarded due to their being negligible with regard to the inertial forces.
27. If a beam of radiation is absorbed, it is also refracted. Preventing absorption from taking place one can thus simultaneously prevent refraction from taking place.

Ex. 7. Translate into English. Use Gerund.

1. Существуют различные способы передачи энергии потребителю (a consumer).
2. Теперь стоит сослаться на аналогию между электрическими линиями тока и линиями тока в жидкости.
3. Бесполезно решать эту аэродинамическую задачу, если Вы не знаете теорию подъема (lift).
4. Вы не сможете вычислить сопротивление проволоки (a wire), не используя закон Ома.
5. Что мешает Вам решить эту проблему обычным (стандартным) (conventional) способом?
6. В этом случае стоит придерживаться (to stick to) обычного метода перевода единиц.
7. Стоит повторить основные уравнения предыдущей главы.
8. Он не мог не упомянуть главный источник ошибок.
9. Что мешает новому прибору работать в обычных условиях?
10. Мы не можем получить другой конечный результат, не изменив начальные условия.
11. Им удалось выразить наиболее сложные явления природы точно и кратко.

12. Вам следует стараться не (избегать) повторять эти ошибки.
13. В этой реакции есть только один способ повысить температуру.
14. При перемещении заряда из одной точки электрического поля в другую совершается работа.
15. После перемещения заряда в другую точку электрического поля напряженность поля в этой точке меняется.
16. Что мешает Вам исследовать данную область?
17. Нам удалось представить уравнение в удобной форме.

Ex. 8. Translate into Russian:

1. Newton's being well known all over the world can be attributed to the fact that his theory of gravitation seems understandable to everyone.
2. His having used a device for the continuous removal of heat did not solve the difficulty encountered in the experiment.
3. The device being highly accurate is of great importance for obtaining precise experimental data.
4. Their having obtained similar results simultaneously contributed to a greater accuracy of the computations in spite of certain complications.
5. The steady temperature of the medium results in the external loss of heat by radiation being negligible.
6. The motion of the fluid results from the hot body having been placed in it. This gives rise to temperature and hence density gradients. It is worth noting that the fluid moves under the influence of gravity.
7. This ratio depends on the densities of the working substances being equal.
8. The influence of the conductance on the value of the electric current depends on the conductance being inversely proportional to the resistivity.

9. We can rely on Ohm's law being true over an extremely large range of values of V separated by factors of 10^{12} or more.
10. He objected to the readings of the device being treated by a conventional method.
11. I insist on your using the term "convection" in a strict sense, for the process of transferring heat in a fluid by the movement of the fluid itself is referred to as convection.
12. Apart from being dependent on the shapes of the bodies involved the form of the functions f_1 and f_2 also depends on the reciprocals used.
13. In addition to introducing the Nusselt and Prandtl numbers we are to change the system of notation.
14. Besides including a great many values at fixed pressures the table was extended to include some new values at fixed temperatures. This table now is of considerable practical use.
15. Because of free electrons being charge carriers, the density of the electric current is directly proportional to the concentration of free electrons.
16. Due to being negligible the relative velocity of the motion between the hot body and the fluid makes the contribution of the convective flows negligible.
17. Instead of using the system of notation for multiples in the British gravitational system we utilized the SI system.
18. In spite of having used conventional methods of analysis they succeeded in solving the problem in a non-conventional manner.
19. Owing to the stream function being constant the curves in both cases give the streamlines of the fluid motion.
20. Apart from preventing plasma from coming into contact with the walls of the reactor this process stabilizes the plasma itself and fixes its form.

SUBJUNCTIVE MOOD

If he were at home now If he had a cell telephone	he	would could might	answer the telephone. call you back.
If he had been at home last night If he had had a cell telephone with him	he	would could might	have answered the telephone. have called you back.

Ex. 1. Translate the sentences with and without the Subjunctive Mood.

1. If charged particles attract, they have the charges of opposite signs. If the reverse is the case, the particles have similar charges.
2. If a charged body is placed between two parallel metal plates (that are oppositely charged), it will move parallel to the field.
3. If a piece of iron were placed in a uniform electric field (no matter how strong), it would not move at all.
4. The separation between two electrodes would be most efficient if the inner (внутренний) electrode were made as thin as possible.
5. If neither mechanical nor chemical work is done, the electric energy is transformed into heat in the conductor.
6. One might suppose that if such phenomena existed, they would surely have been noticed by now.
7. If you imagine yourself to be swimming in the wire in the direction of the current and facing a magnetic needle, then the north pole of the needle is deflected towards your left hand (Ampere's rule).
8. If the experiments provided additional evidence, the theory would be extended and deepened.
9. Right-hand rule. Hold the thumb, first finger and middle finger of the right hand at right angles to one another. If

you point the thumb in the direction of motion, the first finger along the lines of the field, then the second finger will point in the direction of the induced current.

Ex. 2. Change the sentences into the Past.

Example: I would do it if I had the time.
I would have done it if I had had the time.

1. If he provided enough evidence for this statement, we would accept his point of view.
2. If we presented our papers simultaneously, no complications would arise.
3. They would violate this law, if they went too far in their assumptions.
4. If we had all the necessary equipment, we would start the research immediately.
5. We would avoid the error, if the corresponding measures were taken.

Ex. 3. Change the sentences according to the model.

If he comes, we will discuss it.
If he came, we would discuss it.
If he had come, we would have discussed it.

1. If we have a good theory, we will resolve many difficulties.
2. If this is the case, the voltage will drop.
3. If he presents convincing facts, no one will have any doubts about the ultimate results.
4. The research process will become considerably simplified if the laboratory takes the right direction.
5. If the conditions are improved, no special mechanism will be required.
6. If there is another energy-loss mechanism, the amount of Cerentsov radiation may be smaller than the anticipated one.

Ex. 4. Translate into Russian. Mind the translation of 'should'.

Example I:

If you should see him *Should you see him*	*tell him the truth.*
Если случится так, что Вы его увидите, *Случись так, что Вы его увидите,*	*скажите ему правду.*

Example II:

If we should violate *Should we violate*	*the conditions of the experiment*	*1. the results will be different – результаты будут другими.* *2. the results would be different – результаты были бы другими.*

1. Should the speed drop, there will be a rapid increase in torque (момент вращения).
2. Should the reaction proceed smoothly, the end product might increase.
3. If you should encounter some obstacles, you could overcome them easily.
4. Should the complete theory of the structure of matter be created, it would enable us to evaluate the energy of each particle.
5. Should they repeat the experiment, they could obtain more precise results.

Ex. 5. Translate into Russian. Mind the inversion in the subordinate clauses.

Example: Were the device in order, we would continue the work.
Если бы прибор был исправен, мы бы продолжили работу.

1. Were it possible to reduce the price by only one percent, the system would pay for itself in one year.

2. Were there no loss for friction, the motion would continue indefinitely, once it had been started.
3. Were the coil wound in this matter, it would be somewhat large to be used at frequency below 300 Kc.
4. Had we a compass at hand, we could investigate the magnetic field in the neighbourhood of a wire.
5. Had Faraday's experiments been recognized in his time, a great many errors of the next half-century could have been avoided.
6. Should you use both permanent magnets and electromagnets in your experiment, you could observe the similarity of their action.
7. Should you investigate in detail all possible types of this effect, you could notice the indistinguishable differences between them.
8. Could they select the right medium, the experiment wouldn't fail.
9. Could you watch three simultaneous TV broadcasts from one screen at a time, you would save time.

Ex. 6. Translate into Russian. Mind the construction *'but for' (if it were not for).*

Example:

But for *If it were not for* *Were it not for* *Если бы не* *If it had not been for* *Had it not been for* *Если бы не (в прошлом)*	*the computer,* *компьютер,* *the traffic jam,* *«пробка»,*	*the problem would remain unsolved.* *задача осталась бы нерешенной.* *the conference would have started in time.* *конференция началась бы вовремя.*

1. But for the magnetic field the particles would move in the same direction with the same relative displacement.
2. But for the potential barrier the electrons would receive sufficient energy to escape (освободиться).

3. If it were not for the desired level of concentration one wouldn't expect such an instantaneous reaction to take place.
4. Were it not for some negligible errors your data might exactly correspond to the theory.
5. But for the experience gained in research our effort would have been in vain.
6. But for the reprocessing (воспроизводство) of fuel in the reactor atomic energetics wouldn't have developed so rapidly.
7. If it had not been for the development of the neutron interferometer we could not have measured the influence of the earth's gravity on the phase of a neutron star.
8. Had it not been for the aid of your laboratory, we would have had to turn to another type of experiments for additional information.

Ex. 7. Translate into Russian according to the model.

Example:

I	insist suggest propose demand require advise	that	he (should) estimate the results immediately. Я настаиваю, чтобы он оценил результаты немедленно.
It is	recommended essential necessary desirable important		the results (should) be estimated immediately. Необходимо, чтобы результаты оценили немедленно.

1. Even if you insisted that the time of the experiment should be reduced to a few days we would not be able to do it.
2. Why has it become necessary that "cold" neutrons should be produced?

3. It is desirable that your actions should be consistent (agree) with your beliefs.
4. More over you cannot insist that all your questions should be answered at once.
5. He was the first to suggest that acoustical holography should be applied below the surface of the sea.

Ex. 8. Contradict the following sentences by using subject clause in the Subjunctive Mood. Translate into Russian.

Example: The old program is not re-examined. (It is desirable)
It is desirable that the old program (should) be re-examined.

1. The students' initiative is not encouraged. (It is important)
2. The research worker is not informed about fundamental investigations in adjacent areas of science. (It is desirable)
3. The object viewed is not placed at the focus of the lens system. (It is essential)
4. Electrical conductors do not form a continuous closed circuit. (It is necessary)
5. The surfaces in the telescope do not have high reflecting power. (It is necessary)

Ex. 9. Translate the sentences with and without the Subjunctive Mood.

1. It is important that the propagation coefficient is small.
2. It is important in my experiment that the propagation coefficient should be small.
3. It is important that the particles are vibrating in the same phase over the wavefront.
4. It is important that the particles should be vibrating in the same phase over the wavefront.
5. It is essential that nodes commonly occur in standing waves.
6. It is essential that the discharge should occur in the gas-discharge tube.

Ex. 10. Translate into English according to the model.

he	look(ed) speaks (spoke) behaves (ed)	as if as though	he	were (had been) angry with me сердит (был сердит)… were (had been) surprised to see me удивлен (был удивлен)…
		как будто как если бы	он	

I.

1. She looks so disappointed as if she had failed her exam.
2. Why do you treat me as if I were your enemy?
3. He looked at me as though he suspected me of something disgraceful (бесчестный, постыдный).
4. After our long unpleasant conversation he spoke as if nothing had happened.

II.

1. Он выглядит так, как будто он самый счастливый человек в мире.
2. Почему ты ведешь себя так, как будто ничего не случилось?
3. Почему ты кричишь, как будто я глухой (deaf)?
4. Он говорил по-английски так бегло, как будто прожил в Англии много лет.
5. Не смотри на меня так сердито, как будто я виноват.
6. Я была так удивлена услышать эту новость, как будто я никогда не слышала о его прошлых деяниях (doings).
7. Он ведет себя так, как будто что-то подозревает.
8. Они так долго обсуждали эту проблему, как будто она жизненно необходима для них.
9. Они задавали такие странные вопросы, как будто они раньше ничего не слышали об этом.
10. Посмотри! Она так отлично катается на коньках, что кажется, будто она летит по льду.

Ex. 11. Translate into Russian. Pay attention to the Subjunctive Mood.

1. If we knew the radii of curvature of two surfaces and the index of refraction of the glass, we might calculate the focal length of a simple lens.
2. If we wanted to have quantitative measurements of wavelengths, we should have to refer to diffraction phenomena.
3. The neutron of this wavelength has approximately the same kinetic energy it would have if it were in random motion at room temperature.
4. Provided (that) the reflection occurred at a denser medium, there would be a change of phase of π, if it occurred at a less dense medium, there would be no change of phase.
5. Unless a low potential difference were present between the cathode and the plate (anode), the velocity of the positive ions might become sufficiently great to damage (повреждать) the cathode.
6. Unless there were a deep connection between the weak force and the electromagnetic force, it would be difficult to see why the weak interaction (force) should depend on the electric charge of the particles.
7. The analysis of the events implies that the same result could be obtained in both experiments even though experimental techniques were quite different.
8. If such a particle were to strike a target or another particle of the same size and velocity, one would obtain a pulse with a power of some 10^{11} watts for about 10^{-13} seconds.
9. To probe the Planck unit of time $5.36 \cdot 10^{-44}$ sec and length $1.61 \cdot 10^{-33}$ cm experimentally, using instruments built with present technology, one would need a particle accelerator the size of the galaxy!
10. In case we had to double the force pushing the electrons around a circuit, we could expect them to move twice as fast, other things being equal.

11. Were the mass of the atom distributed uniformly throughout the atom, it could occupy a spherical volume whose radius is about 10^{-10} metres.
12. The electrical properties of germanium might be changed were it exposed (подвергать действию) to light.
13. Were Maxwell's statement always true, the refractive index would be a constant and the output (выход) of the interferometer would be directly proportional to the intensity of the incident beam.
14. Should there appear any change in power supply, the device would immediately register it.
15. Should we measure the deflection of the beam, we would find that it is to be investigated.
16. Could Einstein come back, he would be surprised that the quantum theory still stands unmoved enriching field theory and being enriched by it.
17. If the molecules of water had been divided into small parts, it would not have been water any longer but some other substance.
18. Had we had a new means of studying such forces, we could have calculated the trajectory of this particle.
19. But for the effect of electric resistance the electric current would be only limited by the number of electrons available, when the potential difference is maintained between the ends of a conductor.
20. But for the atmospheric windows the electromagnetic radiation of certain wavelength would not penetrate the earth's atmosphere.
21. If it were not for the interface there would be no refraction of the light ray, that is bending of the ray of light when passing from one medium to another.
22. A gas couldn't conduct electricity were it not for the presence of charge carriers constituting the medium of conduction.

23. Were it not for the path difference between two waves, the superposition of two waves, both of the same frequency, would yield a wave of the same frequency.
24. If it had not been for an extremely high electric field, the positive ion would have never reached the energy much lager than that of the neutral gas molecule.
25. To avoid as many complicating factors as possible we treat the system as though it were a single particle.
26. Applied mathematics deals with physical quantities as though they were mathematical concepts.
27. In other words the geomagnetic field looks as if it were the field that would be generated by a bar magnet at the centre of the earth, the lines of force looping from the south magnetic pole to the north.
28. The device to be replaced behaves as if it had been operating for many years.
29. Mendeleyev found it necessary to change some atomic weights in order that the elements should fall into positions in the periodic system assigned to them by their chemical properties.
30. In order that the magnetic effect of a current might be demonstrated, connect a long piece of wire to an accumulator and a rheostat and place a magnetic (compass) needle near the wire.
31. You should give the interpretation of this fact from an entirely new viewpoint lest you should repeat the previous mistakes.
32. In this interferometer an opaque (светонепроницаемый) barrier should be put lest the waves should intersect.
33. According to his demand it is necessary that the students should present either a diagram or a scheme, the latter being less desirable.
34. It is important for geometrical optics that an incident ray, a normal and a reflected ray should lie in the same plane and the angle of incidence should be equal to the angle of reflection.

35. The scientific method of investigation requires, first of all, that the problem be set, then that the experimental data be collected and analysed.
36. "If the beam of rays in the cathode-ray tube is influenced by a magnet, why should it not be influenced also by an electrostatic field?" – thought Thomson.
37. Faraday's basic idea was the following: if an electric current in a wire can produce a magnetic effect, why should a magnet near a conducting wire not produce an electric current.
38. If we were to reverse the direction of the current we would get the same pattern and the direction of lines of force would be counterclockwise.
39. The lines of force would bend and deflect more and more from each other provided the surface of the conductor were plane over a limited area.
40. Unless otherwise stated, it would be better to evaluate these relationships with the aid of conventional methods.
41. Had there been an appreciable interaction between an incoming and outcoming waves, this condition could have been satisfied.
42. If it had not been for the latest evidence, we could not have found out the cause of the compass needle deflections in the particular region.

Ex. 12. Translate into English.

A

1. Если бы вы выполнили эти расчеты, вы смогли бы подтвердить новую теорию.
2. Если бы мы упростили эти уравнения, количество (the number) ошибок увеличилось бы.
3. Если бы выбор системы единиц был правильным, мы бы получили точные результаты.
4. Если бы скорость света не была такой большой, то напряженность магнитного поля не подчинялась бы закону Био-Савара.

5. Если бы приборы были расположены в одном месте, было бы удобнее наблюдать за их работой (operation).
6. Если бы мы знали коэффициент преломления данного вещества, мы бы могли определить скорость света в этом веществе.
7. Если бы не численные методы интегрирования, то решение многих задач было бы более сложным.
8. Если бы не компас, мы бы не могли исследовать магнитное поле около проволоки с током.
9. Если бы не правило правой руки (right hand rule), он бы не определил направление магнитного поля.
10. Если бы не компьютер, конечные результаты не могли бы быть такими точными.
11. Если бы не магнитное поле, стрелка компаса не отклонилась бы (to deflect).
12. Если бы не экспериментальные доказательства, мы не могли бы сравнить эти теории.

В

1. Теория излучения атома требует, чтобы изменение орбитального количества движения атома равнялось ±I.
2. Чтобы получить хорошую интерференционную картину, необходимо, чтобы источник света был когерентным (coherent).
3. Желательно, чтобы Вы повторили и расширили Ваши опыты.
4. Важно, чтобы все требования были удовлетворены (to meet the demands) немедленно.
5. Необходимо, чтобы вычисления подтвердили Ваши ожидания.
6. Чтобы доказать, что Вы правы, важно, чтобы Вы собрали все доказательства (evidence).

I WISH

Ex. 13. Study and follow the examples.

It's a pity I make mistakes	*Жаль, что я делаю ошибки.*
I wish I didn't make mistakes	*Жаль, что я делаю ошибки (хорошо бы не, хотелось бы не...)*
It's a pity I made mistakes	*Жаль, что я делала ошибки.*
I wish I had not made mistakes	*Жаль, что я делала ошибки (хорошо бы не...; хотелось бы не...)*

Change the sentences. Use the Subjunctive Mood.

1. It's a pity you exaggerate the danger.
2. It's a pity they can't arrange to do it together.
3. I am sorry that my approach to the problem annoys you.
4. I am sorry that you are not the right person for this position.
5. It's a pity the traditional conference was cancelled.
6. It's a pity we didn't come to a conclusion on that issue yesterday.
7. It's a pity I didn't do well at the job interview. (Next time I will certainly do better)
8. I am sorry I lost my temper and shouted at the supervisor.
9. I am sorry we didn't have lunch. I am hungry now.
10. It's a pity my proposal wasn't accepted.

I want John to start a new job. *Я хочу, чтобы Джон начал*
I wish John would start a new job. *новую работу.*

1. I want my friends to be cheerful and sociable.
2. I want our laboratory to have modern equipment.
3. I want somebody to interrupt his useless activity.
4. I don't want you to complain all the time.
5. I don't want his report to conceal the truth.

Ex. 14. Translate into Russian. Mind the Subjunctive Mood.

I

1. If we examined some of the interference and diffraction effects exhibited by light, we might infer that light is a wave motion.
2. Providing the paths of two waves intersected at a point in a medium, the medium would be simultaneously displaced by the two waves.
3. The electric field would cause a current to flow in the external circuit, provided the electrodes connected to an external load were appropriately arranged.
4. If it were possible to view the ion beam under a superpowerful microscope we should notice that in general the beam would be composed of particles with different velocities.
5. If the circuit through which the electric current is following were partly solid and partly liquid, then the liquid would be decomposed into two parts.
6. If very high power light sources were used, the red end of the spectrum could be extended to almost 900 nm (nanometers).
7. Unless the conditions had changed, one wouldn't expect such an instantaneous reaction.
8. Even if the experiments were completed successfully, the controversy initiated last year could not be settled completely.
9. Even though the distribution concerned yielded the value of the mean velocity equal to $\sqrt{3/\pi hm}$, it could not be stated that this is Maxwell-Boltzmann distribution.
10. Were two identical guns fired at the same target, an increased number of pellets (дробинка, пуля) would penetrate each square centimeter of the target.
11. In general the medium absorbs those wavelengths which it would emit were its temperature raised high enough.
12. Had the vibrations reached the corresponding values simultaneously, they would have been in phase.

13. We do not believe these events to occur at the same time and in the same place but if they should occur we could consider them to be simultaneous.
14. Should you display a desire to learn about the principle of equivalence in greater detail, you might read about it in the succeeding chapters.
15. But for diffraction phenomena associated with a point source of light this arrangement would have justified our hopes.
16. But for a wave theory of light we would not be able to account for such phenomena as interference and diffraction.
17. If it were not for the ionosphere, radio waves would propagate like light waves, only within the range of visible light.
18. Were it not for the cause mentioned above, the beams would be bent or diffracted giving an interference pattern of varying intensity.
19. If it had not been for the instantaneous increase of temperature, we could have avoided undesirable effects.
20. Probably had it not been for an arbitrary choice of constants you would have obtained only one solution.

II

1. It is important that the design should be evaluated accurately for such a complex system to be successful.
2. To treat a more general case it is required that the above restriction should be removed.
3. With a view to preventing the loss of energy it is essential that the temperature be maintained constant throughout the process.
4. In such a waveguide (волновод) it is necessary that a single light ray should zigzag back and forth inside the waveguide reflecting successively at the upper and the lower interface.

5. For our assumption to be correct it is desirable that the interaction between the different plasma constituents be negligible.
6. The theory of refraction demands that the index of refraction of glass should be less than that of water.
7. Thus to account for the phenomenon involving the interaction of light with light he suggested that a wave theory should be used.
8. We insist that in the optical system in hand the angles of incidence, reflection and refraction be clearly distinguished.
9. In order that we might specify both the speed of a body and its direction of motion, we use the term velocity.
10. In order that you might obtain a waveform you have to plot the instantaneous values of the periodic quantity versus time.
11. The lenses were arranged so that a parallel beam of light should fall on the diffracting object.
12. A suitable system of units must be chosen so that you might develop the equations in a conventional manner.
13. This constant is referred to as linear absorption coefficient lest one should confuse it with absorption coefficient mentioned earlier.
14. The amount of light reaching the central point of the diffraction pattern must be negligible lest the intensity at that point should be changed.
15. We have seen that electrons in a crystal have wave properties as though they were in free space.
16. When an electromagnetic wave propagates through uniform plasma it behaves as if the plasma were a homogeneous dielectric medium.

Ex. 15. Match the sentences on the left with the suitable one on the right.

1. If you eat more than you need,	a) she wouldn't sing in the bath.
2. If the dog keeps barking,	b) what would you do?
3. If I were you,	c) he would never get this job.
4. If he had been driving carefully,	d) the extra calories will turn into fat.
5. If you are not doing anything later,	e) we will go to the theatre.
6. Had the ice not melted,	f) he might have avoided that accident.
7. Henry spoke to his dog as if	g) the neighbours will complain.
8. I wish	h) we would have been here earlier.
9. If it were not for your uncle	i) why don't you buy a computer?
10. If I have time.	j) it could understand him.
11. If I met a fairy one day,	k) I wouldn't buy the jeans.
12. If I had known you were coming,	l) we could go skating.
13. If you were in my shoes,	m) come and see us.
14. But for the traffic jam	n) I would make a wish.
15. If you have enough money,	o) I could have met you at the station.

SUPPLEMENT

MODAL VERBS + PERFECT INFINITIVE

Ex.1 Fill in the gaps[1]:

could have	might have	should have
couldn't have	must have	shouldn't have

The night Uncle Bob was arrested.

A. Tell me the story about the night Uncle Bob was arrested.
B. You don't really want to hear that old story again. I must have told it to you a hundred times!
A. I know. But I'd like to hear it again.
B. Well, all right. I'll never forget the night they arrested your Uncle Bob for stealing a car. As soon as I heard he was in trouble, I called the police station because I knew he _____ done anything like that. Not your Uncle Bob! He _____ _____ been driving too fast, or he _____ missed a stop sign, but I just KNEW that he _____ stolen a car! I knew that the policeman _____ arrested the wrong man. Later, we found out what really had happened. Your Uncle Bob couldn't find his keys and was trying to get into his car. The only way he could do that was by breaking the window. That's when the police arrived. Your Uncle Bob _____ _____ been so impatient. He _____ called me because I had the keys to his car all the time. He had left them at my house and _____forgotten them.
A. That's my favorite story. Thanks for telling it.

Ex.2 Fill in the gaps:

could have	might have	should have
couldn't have	must have	shouldn't have

[1] Steven J. Molinsky, Bill Bliss; *Side by Side. Activity. Work book,* Prentice Hall., Inc, Englewood Cliffs, New Jersey.

1. I'm so hot! I shouldn't have worn my winter coat today. I'm sorry I did.
2. Your house looks like new since the fire. You _____ _____ spent a lot of time repairing it.
3. Michael _____taken us sailing on such a windy day. We _____ got seasick.
4. It was so dark in my basement that I fell down the stairs. I _____ fixed that broken light.
5. Patty is crazy! She _____ got to New York any way she wanted. Why did she hitchhike?
6. I called Stuart's apartment all night and nobody answered. He _____ gone out.
7. You _____ swept the front porch. It looks so clean.
8. He _____ stolen the car. He was with me all the time.
9. My washing machine is broken. The repairman said I never _____ tried to wash four pairs of sneakers and five pairs of jeans at the same time.

Ex. 3 Translate into English.

1. Нам следует решить эту проблему немедленно. Чем скорее, тем лучше.
2. Вам не следовало бы упоминать сделанные ошибки. Сейчас вам следует упомянуть только ваши новые результаты.
3. С какой стати я должен отвечать (to be responsible for) за все неудачи?
4. Вам не следовало бы вмешиваться в их дела (affairs). Теперь вам придется извиняться перед ними.
5. Нам не пришлось ждать. Представление началось, как только мы вошли.
6. Если бы скорую помощь вызвали сразу же, больного (the patient), возможно, спасли бы.
7. Люди не должны принимать лекарства, выписанные другим (to prescribe a medicine).

8. Вашему другу пришлось идти пешком до станции. Вы могли бы подвезти его (to give a lift).
9. Полиция, должно быть, ищет преступника / ищет преступника уже целый год / поймала преступника.
10. Собрание будет скучным, но вам придется посетить его (to attend, to be present at).
11. Это моя вина, вам не надо извиняться (to apologize).
12. Вам не надо ждать директора, секретарь сможет подписать ваши документы.
13. Мне не пришлось ждать директора, секретарь подписала все мои документы. У меня не было необходимости ждать директора, секретарь подписала все документы.
14. Он так богат, что ему не надо работать (зарабатывать на жизнь – to earn his living).
15. Согласно положению вещей (according to the state of things), я должен был обо всем договориться (to arrange everything).
16. Собрание должно было начаться в 10 часов, но его отменили.
17. Если вы вступите в армию, вам придется носить форму.
18. Он, вероятно, останется / остался дома. У него, вероятно, грипп / был грипп.
19. Информация на эту тему, вероятно, привлечет / привлекла всеобщее внимание.
20. Эти формальности могли быть выполнены намного скорее, если бы вы заранее выслали договор по факсу.
21. Нам приходится принимать меры предосторожности (to take precautions) против террористов.
22. Боюсь, я не смогу предупредить об опасности.
23. Вы могли бы избежать опасности, если бы включили фары (head lights) машины.

24. Она, наверное, пишет отчет о проделанной работе / пишет отчет с утра / пишет отчет полчаса / написала отчет.
25. Он никогда не мог найти хорошую работу с хорошей зарплатой.
26. Последнее время я не могла убедить их поменять решение (to change their mind).
27. Вероятно, это не плохая мысль предупредить их об опасности.
28. Они, вероятно, не получили ваше сообщение, вот почему они не встретили нас.
29. Вы, вероятно, забыли, что это был срочный вызов (an urgent call). Больного следовало бы госпитализировать немедленно (to take to hospital).
30. У нее мог бы быть нервный срыв (a nervous breakdown).
31. Вряд ли (не может быть) он преодолел все трудности.
32. Неужели он все еще ждет меня? Не может быть, что он ждет меня.
33. Неужели это чистое совпадение (это было чистым совпадением)?

INFINITIVE

Ex. 1. Translate into Russian.

1. To place a pair of slits in the vicinity of the source so that the source should be equidistant from each slit is a very important condition of the experiment.
2. To obtain a high intensity of illumination at a particular observation point is easy enough since the light from the effective zones arrives in phase.
3. To account for this diffraction pattern we have to assume that the contributions from the adjacent zones are nearly equal but are out of phase.

4. In order to avoid the difficulties of the problem in hand one should analyze the vibrations of all the atoms in the crystal in terms of a spectrum of travelling waves.
5. The electrons being attracted to a fluorescent anode screen are focused on to the screen by an electron optical system to form a visible image.
6. The presence of the effects involved is to be attributed to the fact that the radii of Fresnel zones are very small.
7. A simple way of demagnetizing a substance is to place it inside the coil and to pass an alternating current through the coil.
8. His task was to examine the operation of an interferometer, the device in which fringes are produced and used to make accurate measurements of wavelength.
9. From the explanation to be followed by the demonstration we shall see that interference can also be produced by waves originating from two or more different sources.
10. For slits 2b apart the separation of successive bright fringes to be formed on the screen is $\lambda D/2b$, where D is the distance between the screen and the pinholes.
11. The top mirror to receive the light from the object will direct it down to the lower mirror placed close to the eye of the observer.
12. Newton also designed telescopes and was the first to suggest the use of curved mirrors for telescopes.
13. Kepler was the first to postulate that every planet moves in an ellipse, the sun occupying one of its foci.
14. For interference to occur the light beams must be coherent.
15. In order for the center of the diffraction pattern to be bright, an odd number of zones is to be effective while an even number results in a dark central point.
16. The idea of the theory is for a measurement on a system to disturb the system itself.
17. A small change in temperature for the student to observe could occur owing to an adiabatic expansion of a gas.

18. It is for him to settle this particular contest initiated 2 years ago.
19. In that event it is necessary for these wavelets to interfere with each other to produce the interference pattern.
20. It is possible for a single path to be used for the simultaneous transmission of several signals in any of the available media.
21. They think a hypothetical elementary particle (graviton) to be responsible for the effects of gravity.
22. In doing the experiment the students found light rays to bend in the presence of large bodies.
23. In this connection we may believe the path difference to be an odd half-integral number of wavelengths.
24. From optics, we know superposition of two or more waves originating from a common source to result in regions with a minimum intensity (nodes) and a maximum intensity (antinodes).
25. This conventional lens system enabled us to view opaque objects.
26. A microscope enables an enlarged image of small objects to be produced.
27. The particle drops through the atomic energy levels, causing photons to be emitted before colliding with the nucleus.
28. The controversy arisen made him design the device that simulated the behaviour of the actual system at any frequency.
29. He proved the geometric image to be the place of the greatest concentration of ray intersections.
30. It was proved to be the case provided the rays forming the image are restricted to those passing near the axis of the system.
31. It proved to occur when the appearance of additional dark regions in the pattern had been preceded by a further reduction in the gas pressure.

32. The reverse proved to be the case when two or more vibrations of waves were superimposed upon each other.
33. The image space no matter real or virtual has proved to be a convenient mathematical conception to describe where images may lie.
34. The history of science provides many examples of physical events that were once thought to be elementary but later turned out to be composite (complex).
35. Interference fringes may be seen to appear across the overlapping areas of the two beams.
36. According to Huygens's principle each point in the slit is considered to be a source of secondary waves that spread out in all directions.
37. Counterclockwise moments of a force about an axis are taken by convention to be positive and clockwise ones negative.
38. If light from the source S passes through a pinhole and is incident on two further pinholes *A* and *B*, light and dark fringes are found to appear on the screen where the resultant narrow beams of light overlap.
39. The disturbance involved is likely to be caused by undesired signals, atmospheric fluctuations, etc.
40. Hence the intensity of the beams is unlikely to have been affected by the temperature of the surrounding medium.
41. The laser has a linewidth of the order of 10^4 hertz. This is sure to be much narrower than that of other radiation sources, the best monochromatic beams having a linewidth between 10^8-10^9 hertz.
42. In this direction the ordinary and extraordinary rays are certain not to exhibit double refraction while their velocities are equal.
43. As to this form of waves the particles of the transmitting medium appear to be displaced along the direction of propagation.
44. These values seem to correspond to the greatest and least refractive indices.

Ex. 2. Translate into Russian.

1. Consequently if this system is to serve as a voltmeter, a resistor had to be added in series.
2. There is some convincing evidence that the abundance of heavy ions in plasma is to give rise to the reduction of its lifetime.
3. For the assumption to be correct it is necessary that the interaction between different plasma constituents be negligible.
4. As far as certain solids are concerned the gamma-ray photon has the correct energy in order to be absorbed by another nucleus in a similar process.
5. The time taken for half a given number of atoms of a particular radioisotope to be transformed is called the half-life. It can range from $1.5 \cdot 10^{-8}$ seconds to $1.4 \cdot 10^{10}$ years.
6. With the advent of gas lasers a new range of wavelength has been opened. High quantum efficiency has made it possible for us to reach practical efficiencies of the order of 20 to 30 percent.
7. The mutual distance of free electrons is on the average never less than 10^{-5} cm (which means 1000 interatomic distances in a solid). At these distances the only interaction to be considered between the electrons is the electrostatic repulsion (отталкивание) due to the charge of the electrons.
8. In the field of solar energy it is reasonable to expect the sunlight to feed our electric circuits and to find wide applications on the earth.
9. One of the greatest mathematicians of ancient Greece Euclid was the first to build up the entire science of geometry on several axioms. For 2200 years all mankind believed Euclid to have given a clue to the absolute truth.
10. Some reactions are so rapid that they appear to be instantaneous, while others are so slow that at ordinary temperatures no detectable change would be observed.

11. The acoustic microscope is believed to find its place along with the optical microscope, for it has already begun to yield images that may be obtained with conventional light microscopes.
12. The experiments made and being made by this team of scientists are most likely to give a new insight into nuclear processes.
13. Neutral equilibrium may turn out to be either stable or unstable equilibrium, should a large enough displacement be applied.
14. The first nuclear weapon is known to have been the atom bomb or A-bomb. The first bomb consisted of only a few kilogrammes of uranium-235. It is taken for granted that all later models of the A-bomb were small compared with the hydrogen bomb or H-bomb.

PARTICIPLE

Ex. 1. Translate into Russian.

1. Representing the electric field by lines of force we can easily count the total number of lines of force leaving and entering the surface.
2. Using Bohr's atomic model one can visualize the mechanism of atom interactions.
3. The electrons originating in the thermoionic emission should have a Maxwellian distribution of velocities.
4. Most of the mechanisms giving rise to electromagnetic radiation of low temperature plasma are atomic in nature.
5. The region referred to as vacuum is characterized by the absence of gravitational and electromagnetic fields.
6. It is convenient to make use of new information provided by a computer.
7. The system of units based on foot, pound and second has now been replaced for scientific and theoretical purposes by SI units.

8. Experience shows that following the procedure involved the scientists can avoid the errors encountered in the experiment.
9. The procedure followed by the students remained the same without regard to the conditions of the experiment.
10. The flight preceded by the careful development of the design was successful.
11. The calculations followed by the comparison between theoretical and experimental results were made in accordance with the model chosen.
12. The charges being distributed over the entire surface of the body give rise to the lines of force.
13. Being carried out by an electronic computer the calculations may be relied upon.
14. Having isolated the device from external effects we expected it to indicate the value of the signal more precisely.
15. Having reached the thermal equilibrium with the substance the neutron can be absorbed by uranium-235.
16. Having made all the calculations they found that at all temperatures there was theoretically a small number of molecules whose velocity approached infinity.
17. Having been simplified the equation took on a new appearance.
18. Having been applied in theories of electric and thermal conduction this model was reshaped and found application in many other theories.
19. If expressed in accordance with classical kinetic theory of gases the mean free path is independent of temperature.
20. Once formed a molecule will move about and behave as a unit particle under various physical conditions.
21. If given a more delicate instrument one can measure smaller electric charges at greater distances.
22. Unless carried out by a computer the calculations will take a lot of time.

23. When performing one integration we can obtain the velocity of charged particles, when performing a subsequent integration we can obtain the distance travelled.
24. While causing ions to move in the opposite direction (under a potential difference) we produce chemical changes in a chemical compound or solution (раствор).
25. While examining the operation of the apparatus the scientists discovered two other important sources of errors.
26. The line passing through the two charges is referred to as the axis of the dipole, the positive direction of this axis being in the direction from the negative to the positive charge.
27. Many substances can exist in more than one state, the state depending on the substance itself, as well as on its volume, temperature and pressure.
28. There being no charge within the closed surface, no lines of force will originate or terminate within the surface.
29. Other conditions being equal, the substance will violently react.
30. If, as is usually the case, the only external force is a uniform pressure p, then $TdS = dU+pdV$, this being a convenient mathematical statement of the first and second laws of thermodynamics taken together.

Ex. 2. Translate into Russian.

1. The lens L intercepting the rays causes them to focus in the focal plane of the lens.
2. The corresponding set of fringes appearing in Fig. 4 is due to the heavy hydrogen line which obviously has the same double structure as ordinary hydrogen.
3. Simulating a telescope of any system we should take the proper diameters of the lenses.
4. Attempting to measure the velocity of the earth through the ether (эфир) Michelson and Morley arrived at the conclusion (1887) that the ether was not responsible for carrying light waves and other electromagnetic waves.

5. Radiation restricted to a very narrow band of wavelengths (ideally one wavelength) is referred to as monochromatic radiation.
6. The space programme compared with that applied so far provides a possibility of extending the research by placing the radio telescope beyond the ionosphere.
7. A wave theory of light is based on the concept of wavelets or secondary waves spreading from each point affected by a disturbance.
8. The theory referred to above fails to account for the interactions of light with matter.
9. The conclusion arrived at is true, as the optical path between two successive positions of a wavefront, measured along rays, is constant.
10. The spectroscopic methods properly used yielded a lot of information for the determination of energy levels and molecular structure.
11. The similarity observed provided a method of studying three dimensional sound waves.
12. Used as a reference line, F-line helps to specify the refractive index, dispersion of optical glass, etc.
13. Placed at the proper distance apart, the point sources will give rise to two overlapping diffraction patterns.
14. Given the appropriate condition, the value of an applied a.c. voltage does not exceed the value of the simultaneously applied d.c. voltage.
15. The energy being delivered to the tube by the source of plate potential is lost in accelerating the electron from cathode to anode.
16. The ratios of the rates of the reactions are being explored in order to determine the amount of plutonium-239 being produced in the reactor.
17. Being subjected to the magnetic field, the needle is seen to deflect.

18. Being displaced from its neutral position, a vibrating system oscillates about this position with a frequency characteristic of the system.
19. Water is composed of two gases, which being apart are quite invisible.
20. Having announced their ultimate results, they did not stop investigating separate images of the objects.
21. Having incorporated all the explanations of the older theories, wave mechanics was extended to explain more complex atomic phenomena.
22. Having been evaluated, the altitude of the star was compared with that of the sun.
23. Having been plotted on the graph, these values formed a curve of wavelength vs intensity of radiation.
24. Plane waves when reflected may produce standing waves.
25. The Michelson-Morley experiment showed that there was no appreciable difference between the velocity of light when measured in the direction of the earth's rotation and when measured at right angles to this rotation.
26. An electric particle gives rise to an electric field and when set in motion gives rise to a magnetic field; a magnetic particle would give rise to a magnetic field and when in motion produce an electric field.
27. Leptons are not subject to the strong interactions but only to the weak ones or, if charged, to electromagnetic interactions. The photon constitutes its own group, taking part in neither strong nor weak interactions.
28. If given an initial wavefront, Huygens's method assumes that every point on this wavefront is a new source of disturbances from which a new circular secondary wave spreading outwardly originates.
29. When exploring the above effect one should specify the ratio of the wavelength studied to the difference in the wavelengths which can be separated.

30. While examining spectra of stars one may infer that stellar spectra indicate chemical composition as well as temperature.
31. Unless otherwise stated, this equation should be treated algebraically.
32. Unless otherwise specified, this quantity should be derived without introducing any numerical factors.
33. The position of the prism having been changed appropriately, the spectrometer was used to isolate one wavelength of radiation.
34. One of the components of the velocity of a body moving in the air being not known, the calculation of the resulting velocity is beyond the reach.
35. The optical images formed by lenses or mirrors being built of a series of diffraction patterns, no lenses or mirrors of finite aperture can ever produce perfect images.
36. Wave motion appears naturally in many different forms, the principal ones being surface waves, electromagnetic radiation and waves in a vibrating string, etc.
37. The computed velocity of the sphere through the water agrees with the measured velocity, this agreement alone indicating that no other large forces are operative.
38. Most elementary particles have a non-zero spin which may either be integral or half integral, with boson having an integral spin.
39. Chemical processes are not always simple, complications due to reversible reactions or to two or more reactions occurring consecutively often arise.
40. It was the reduction of the efficiency of the catalyst that prevented us from utilizing the process concerned on the industrial scale.
41. The uranium isotope of mass number 235 will readily accept a neutron but the nucleus U^{236} so formed is very unstable.

42. The melting point of a solid, unless otherwise stated is taken at standard atmospheric pressure (760 mm of mercury).
43. The mass numbers of these radioisotopes can be represented by a set of numbers: *4n, 4n+2* and *4n+3*, *n* being an integer ranging from 52 to 59.
44. Normally the electron is bound (связан) to the atom but by some special processes it can be liberated from the atom and become a free electron, the latter playing a great role in electronics.
45. The half-life of the isotopes mentioned above being very short, these radioisotopes have either disappeared from the earth's surface or are present in negligible quantities.

GERUND

lind the verbs and expressions after which gerund is used

	To ***give up smoking*** (interfering in smb's private affairs; driving a car carelessly; buying useless things).	
	He ***is used to*** He ***is accustomed to*** He ***is in the habit of***	***treating*** his friends badly ***expressing*** his feelings directly ***concealing and controlling*** his emotions
	I ***can't help accepting*** your plan (dreaming of better life; interrupting your lively talk; admitting my fault; appreciating your efforts).	
	We ***are interested in buying*** your goods (signing the profitable contract; repairing the computer as soon as possible; getting a good discount for the purchase).	
	What ***prevented*** you ***from attending*** classes (being honest with friends; joining the company; escaping the danger of being involved into a dishonourable affair (deal))? What ***kept*** you ***from seeing*** her off?	
	Avoid arguing (lying in the sun; shouting at your friends; putting the blame on other people).	

7.	I ***insist on your treating*** your parents with honour and respect (the results being checked; removing the trouble as soon as possible).	
8.	***No use discussing*** the matter right now (treating him like that; persuading him to change his mind; looking for a new job; rejecting the candidate, he is sure to win).	
9.	The film ***is worth seeing***. What he says ***is worth discussing***. It isn't worth remembering the offence (обида).	
10.	I ***can't bear (stand) deceiving*** people (being deceived; being looked at fixedly; being shouted at; listening to your stupid talks).	
11.	I ***object to*** I ***am against*** I ***am opposed to***	***your missing*** the meeting (resuming the talk; driving fast; imposing my views on other people).
12.	I ***am tired of pretending*** that nothing has happened (working overtime; controlling my feelings; looking through the want ads).	
13.	***Instead of shouting*** you had better explain everything quietly (calmly) (telling a lie think of another reasonable excuse; saving money you had better amuse yourself).	
14.	He ***succeeded in*** concealing his emotions (convincing his friends that it was he who was to blame).	
15.	I ***am fond of playing*** soccer (listening to classical music; wasting money on useless things; living alone (on my own)).	
16.	They ***accuse me of violating*** the law (telling a lie; causing some trouble to people).	
17.	I ***look forward to hearing*** from you (starting a new job with a big salary).	
18.	I ***(dis)approve of including*** this item in the report (of your being (rude) polite to your co-workers).	

Ex. 1. Translate into Russian.

1. Transferring a body from the reference point at the constant level does not require energy.
2. The basis of this method is assigning only the dimensions to each parameter without reference to its value (величина).
3. His purpose is observing the object distant from the earth and studying the information successively.
4. We continued raising the temperature in accordance with the plan of the experiment.
5. I prefer replacing the new equipment by that used before, provided the old equipment has been tested in your laboratory.
6. Heinrich Hertz was the first to succeed in producing electromagnetic waves experimentally.
7. I insist on sending our paper to the journal "Plasma Physics".
8. I insist on being sent to the conference on computers.
9. Measures have been taken to prevent radioactive gases from appearing in the air.
10. Let's choose an appropriate way of assigning numerical values to these coefficients.
11. There is a possibility of determining the positions and energy distribution of gas molecules in using Maxwell's law of distribution of velocities.
12. In carrying out numerical calculations of D it is convenient to consider only real matrices for D.
13. Radar is used in finding the position of a target with reference to a fixed point on the ground.
14. On reducing this field to 0.1 oersted, the a.c. (alternating current) heating became small compared to that due to other sources.
15. Upon increasing the magnitude of charge q the distribution of the charges which produce the electric field is disturbed.

16. By substituting Eq. 5 for W and disregarding the terms of order higher than W we obtain Eq. 6.
17. We cannot change the potential difference of two charges without transferring one of them from one point to another.
18. You can't utilize this device for measuring temperatures without disturbing heat distribution.
19. No further conclusions can be drawn without making assumptions in reference to the nature of the phenomena observed.
20. Through applying this law we can construct curves for all temperatures at various altitudes.
21. Through performing a great number of calculations both he and his colleagues obtained results often referred to.

Ex. 2. Translate into Russian.

1. In a primary cell decreasing the e.m.f. is caused by electrolytic polarization.
2. His ultimate aim was examining the effect of a new means of protection from radiation.
3. By convention the term e.m.f. is used as equivalent to potential difference. But do not avoid applying it to a source of energy.
4. We succeeded in proving that the accepted values were somewhat small for particular wavelength.
5. These chemical changes resulted in forming a steady flow of electrons.
6. New data resulted from examining the effects by means of a suitable model immersed in a tank of conducting liquid.
7. There is no necessity of performing any calculations since the waves travel through free space at uniform velocity.
8. In colliding with the walls of the tank gas molecules deliver momentum to them and give rise to an exertion of pressure.

9. On studying the processes involving the interconversion of electric and chemical energy, the question of their application naturally arose.
10. Upon being defined in terms of the rate of flow of charge the instantaneous current can be calculated according to the formula involved.
11. The device that converts acoustic to electrical energy by using the electrokinetik potential constitutes the basis of the electrokinetik transducer (преобразователь).
12. Instruments of this type will operate with either direct or alternating current without affecting the intensity of the current in the complete circuit.
13. This law states that it is impossible to construct a continuously operating machine that does work without obtaining energy from an external source.
14. In our discussion it is worth mentioning the phenomena that take place when electricity flows through liquids.
15. It is worth while abbreviating a set of well known terms in your paper.
16. We cannot help exploring these flows even though no suitable equipment is available.
17. I could not help making use of this device, for it is the device that constitutes the basis of the particular circuit.
18. It is no use following the usual conversion procedure you chose for solving the problem concerned.
19. It is no good trying to transmit the signals, as the storage battery stopped operating.
20. Removing the second order terms from the equation will result in the equivalent expression.
21. It should be emphasized that adding a third component increases the chance of introducing disorder into the system.
22. Bohr's theory proved successful in explaining the numerical relationships of spectral lines and was accepted enthusiastically by physicists.

23. With one or two rare exceptions, the scientist has never succeeded in maintaining the conditions constant throughout the process.
24. The resulting ions serve effectively as a barrier in the waveguide and prevent the transmitted energy from directly entering the receiver.
25. This leads to the numerical constants being slightly different but essential physical dependences remain the same.
26. Events of unknown origin within the nucleus of radium result in the nucleus being decomposed.
27. Due to its being simple and convenient the metric system is accepted in most countries of the world.
28. Instead of being limited to narrow beams of light and small apertures, the Michelson arrangement uses wide (broad) illuminated surfaces and parallel light, if desired.
29. Light can sometimes be emitted by a solid without being accompanied by heat.

SUBJUNCTIVE MOOD

Ex. 1. Translate into Russian:

1. If we used the cathodes of different materials, we would be able to observe the influence of the materials on the current in certain ranges of the applied field.
2. If we pivoted the magnet so as to turn freely about a vertical axis it would in general tend to set itself in a certain azimuth.
3. Wave function must always be finite: if it were infinite, the particles would be localized at one point.
4. If this were not the case, the increase of temperature would be instantaneous.
5. If an isolated vibrating system were subjected to external influences, the vibrations would be permanent.
6. One would be able to apply this criterion to a system which doesn't involve electromagnetic fields.

7. The lines of force would bend and deflect more and more from each other provided the surface of the conductor were plane over a limited area.
8. Thus Robinson and Cavendish replaced the existing law with a hypothetical new one, which could be accepted providing the experimental results demanded it.
9. A gas could not conduct electricity unless the charge carriers constituting the medium of conduction were present in the gas.
10. Unless otherwise stated, it would be better to evaluate these relationships with the aid of conventional methods.
11. Were the impulse applied tangentially, the equation would take on another appearance.
12. For new materials the corresponding curves might be calculated were the material parameters available.
13. If the wire should be moved vertically upward or downward, parallel to induction, no current would flow.
14. Should the coil be wound in the form of a helix, the magnetic field intensity inside the helix would increase.
15. If the calculations had been performed with the computer, we would have avoided the mistakes.
16. Had there been an appreciable interaction between incoming and outcoming waves, this condition could have been satisfied.
17. The mean value corresponds approximately to the current that would have been obtained if the initial ionization had been uniform.
18. But for the wave theory of light, light might be considered as a collection of independent particles.
19. But for his correct predictions the properties of this substance would have never been investigated.
20. If it were not for the restrictions associated with the new method, we would have never stopped (given up) the experiment.
21. Were it not for quantum effects, the electron would immediately drop on the nucleus.

22. If it had not been for the latest evidence, we couldn't have found out the cause of the compass needle deflections in the particular region.
23. Had it not been for disturbances caused by the presence of the probe, we would have obtained the evidence for the existence of the field.

Ex. 2. Translate into Russian.

1. If we applied a strong magnetic field, it would be responsible for the increase of ionization.
2. There would be a steady current if two resistances were joined together in series with a battery or another resistance.
3. In any event provided a catalyst were added, the reaction would proceed (occur) violently.
4. Unless the field were maintained sufficiently long for all ions to reach the plate, the remaining ions would be reversed in the direction with the reversal of the electric field.
5. Unless specifically stated to the contrary, our assumption would be completely justified.
6. If he were to provide a theoretical justification for a new phenomenon, he might explain a large range of events associated with it.
7. Were the successive stages of the reaction known, the complete equation could be derived.
8. In fact no movement of the needle would be observed were the wire turned so that the current would flow perpendicularly to the needle.
9. If this course of lectures could arouse students' interest in the problem involved, we should arrange some additional lectures.
10. If it were not for the new conditions, the loss of energy would be negligible.
11. But for a computer, the vectorial summation would be beyond the reach of the calculus.

12. If the speed should drop, there would be an immediate increase in torque.
13. If the program in hand had proved wrong, it wouldn't have stood the test of time.
14. If they had had experimental evidence of the electron deflection in this field, they could have set a problem.
15. Had they chosen the system of units properly (appropriately), they could have simplified the evaluation of the magnetic field intensity.
16. If it hadn't been for the complication of the calculations we could have applied a new method for extending the results to general cases.
17. The significance of this quantum number is that it indicates the number of different states that would be produced if an atom were subjected to an external magnetic field.
18. Were the charge carriers constituting the medium of conduction absent, a gas couldn't conduct electricity.
19. Unless the yield (выход) of the reaction had been so negligible we would have detected it with the apparatus available at our laboratory.
20. Needless to say, even if we could see the electron we could not discern (различить) its colour, because its diameter would be so much smaller than the wavelength of visible light that it could not possibly reflect any of visible light.
21. It can be taken for granted that but for Coulomb forces two nuclei of deuterium could occur in the immediate vicinity with each other.
22. Should this no longer be the case we might attempt to seek for another solution on the basis of an alternative hypothesis.

Translate into Russian:

1. It is possible for a γ-ray alone to be emitted when a metastable state of a radioisotope decays to a lower energy state of the same isotope.
2. These experiments may be shown neither to improve nor add anything to the conclusions obtained thus far.
3. In the electron tube (magnetron) the electrons may easily be demonstrated to travel towards the anode or to return towards the cathode depending on the point of interaction with RF (radio-frequency) field.
4. Some reactions, which once were considered to be completely homogeneous, proceeded at least partly on the walls of the container.
5. There proves to be a variety of other applications for which gas lasers might be useful.
6. From earlier theories we know each basic level to be designated by an integer, *n*, called the principal quantum number.
7. Having replaced a closely fitting piston by a rubber diaphragm in the Wilson chamber we can also produce adiabatic expansion.
8. The neutrino, when introduced by Pauli in 1933, was assigned the role of carrying away energy in the beta-disintegration.
9. The refractive index of a refractive medium depending on the wavelength, the focal length of a lens varies according to the colour of the incident light.
10. Another particle that can be emitted by the nucleus is a positron (an antielectron), the disintegration process being analogous to β-decay (распад).
11. Apart from explaining a wide range of reactions this theory also predicts the rate at which they occur.
12. Rutherford's search for a neutron being unsuccessful was accounted for by his having chosen inappropriate sub-

stances for his experiments. It is in beryllium and polonium that the neutron can be easily detected.

13. It is essential that a device designed to select the desired harmonics should be employed in the apparatus being developed.
14. But for the electron microscope, the particles separated by distances of 10^{-6} could not be recorded and photographed.
15. Had a rotating wire traversed lines of magnetic force in this experiment, e.m.f. (electromotive force) would have been induced in the wire.
16. Once recorded, the acoustical hologram can be reconstructed with a laser beam exactly as if it were an optical hologram.
17. Should we measure the deflection of the beam, we should find it to be negligible.

ОГЛАВЛЕНИЕ