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РОССИЙСКОЙ ФЕДЕРАЦИИ

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Кафедра иностранных языков

УЧЕБНОЕ ПОСОБИЕ
ПО ДИСЦИПЛИНЕ «ИНОСТРАННЫЙ ЯЗЫК»

для обучающихся по программам магистратуры и подготовки научно-педагогических кадров в аспирантуре технических направлений

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Данное учебно-методическое пособие по английскому языку предназначено для обучающихся по программам магистратуры и подготовки научно-педагогических кадров в аспирантуре технических направлений. Пособие состоит из текстов с заданиями,, текстов для дополнительного чтения, приложения по грамматике и контрольных заданий.

Цель данного пособия – формирование умения читать, переводить, аннотировать и реферировать оригинальную литературу по специальности и развитие навыков устной речи на английском языке в пределах пройденной тематики.

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Content

Preface

This publication is mainly devoted to the technical courses of masters and post-graduate students in the fields of Mechanization and Technical Service. It is written in simple understandable language dealing with various subject matters of Agricultural Mechanization. In general, the principles of agricultural mechanization in different countries, some global challenges of agricultural mechanization, technical re-equipment of modern agriculture, computer simulation in farm machinery design, etc. are presented here.

This publication has been prepared with the common curriculum in focus and with a specific purpose of importing complete comprehensive information about agricultural mechanization and it is for those who continue their studies in this field.

UNIT 1. AGRICULTURAL MECHANIZATION IN THE USA

STARTING UP

Discuss this question

Do you agree with the statement that American agriculture is an example of the brilliant combinations of hard labour and beneficial climatic conditions?

VOCABULARY

1. Read and translate these words and word combinations into Russian.

Agriculture, decade, dominant trend, dominate, farm, farmer, farming, industry, know-how, productivity, production, proportion, revolution, technological mechanization.

2. Match the words with the definitions.

1. farm	a. the action of making or manufacturing from components or raw materials
2. goal	b. the amount of something produced by a person, machine, or industry
3. implement	c. the activity or business of growing crops and raising livestock
4. production	d. the object of a person's ambition or effort; an aim or desired result
5. productivity	e. what is put in, taken in, or operated on by any process or system
6. yield	f. a tool, utensil, or other piece of equipment that is used for a particular purpose
7. farming	g. an area of land and its buildings, used for growing crops and rearing animals
8. input	h. the state or quality of being productive
9. output	i. an amount produced of an agricultural or industrial product

READING

Read the text

Although there is plenty of food in the world, a lot of it is in the developed countries, like the United States. In order to feed the world, the United Nations General Assembly (UNGA) adopted the sustainable development goals (SDGs) on the 25th of September in 2015. These goals focus on building a sustainable world where environmental sustainability, social inclusion and economic development are equally valued. The first goal is to intensify agricultural production systems. There is no doubt that the application of farm power to appropriate tools, implements and machines – "farm mechanization" – is an essential agricultural input in the USA.

According to published statistical information of the national Department of Agriculture (USDA) in the USA, increased productivity is the main contributor to economic growth in U.S. agriculture. It is apparent that productivity per farm worker had been steadily increased. It arises from innovation and changes in technology. Mostly, it is due to the intensive use of power machines, farm automation and application of other scientific developments, which is a sure result of technological revolution.

In 1820one agricultural worker produced enough food to support about four people, and in the mid-1900s − 14 people already. It was estimated that half of 44 per cent of an increased production per worker between 1917-21 and 1945 was caused by mechanization and the rest –by scientific advances which resulted in growing yields. The crop farming production in the USA dominates over livestock breeding, because crop production mechanization has been advanced to a considerably greater extent than that of livestock industry.

The increase in productivity per worker at the present is about 4-5 per cent per annum. Fifty years ago, labour made up over 32 per cent of the costs of farming; now it is only 3.1 per cent, and the machinery costs in agricultural production, on the other hand, have continued to increase sharply.

In regions, such as parts of the Middle West and of the Eastern States, where the farming is broadly comparable with that of Britain, American methods are worth studying on the account of economic matter, in which the farms are mechanized. Compared with similar British farms, the Americans usually have fewer machines. For example, there is a practice called "custom" work. It is common in the USA. When one of three neighbours owns a corn-picker, another a forage harvester, and the other a pick-up baler, each farmer can work with

his machine for the others, in addition to doing his own work. Yet, they work that equipment for long hours when the occasion demands, and achieve a high output per worker. As to typical American farms, economy in mechanization is assisted by more uniform climate, easy-working soils and good-sized fields of regular shape. Moreover, the fact that there is often only one regular worker − the farmer himself − makes it easy to decide that only one set of implements is needed.

Many agricultural scientists and economists in Europe study mechanization methods applied in the USA. The organization of agriculture in the future will use less land, less labour, fewer but better trained and well skilled managers, and much more capital, machinery and various technologies and know-how borrowed from related industries and distant fields of human activities. New research in energy use, fluid power, machinery development, robotic automation and sensing technologies, artificial intelligence, laser and microprocessor control for maintaining grain quality, and farm structures is expected to result in further gains in the efficiency with which food and fibre are produced and processed. Linking so many technologies and innovations means that waste will be limited, productivity will be maximized and the environment will be affected as little as possible. One way is to be more efficient in the use of resources (including people) in producing food, and also eliminate waste in the supply chain.

COMPREHENSION

1. Answer the questions.

1. What are the main goals of the United Nations General Assembly?
2. What was the reason of the increase in productivity per farm worker in the past years?
2. Why does crop-farming production dominate over livestock breeding?
3. What are the differences between British and American farming?
4. What predictions can we make about the organization of agriculture in the USA in future?

2. Read the text again and decide whether these statements are true or false.

1. To intensify agricultural production systems is the only goal of UNGA.

TRUE/FALSE

2. Productivity per farm worker had steadily increased.

TRUE/FALSE

3. The American farms usually have more machines than similar British ones.

TRUE/FALSE

4. The crop farming production in America dominates over livestock breeding.

TRUE/FALSE

5. The organization of agriculture in future will use more land, more labour and more skilled managers. **TRUE/FALSE**

READING SKILLS. ANNOTATING A TEXT

A. Become an active reader by annotating the texts you read. Annotating a text involves underlining, writing symbols, and taking notes in the margins as you read. These steps can help you to concentrate while you read, increase your understanding, and remember information later.

The margins, between paragraphs, and the space at the end of the text are ideal places to make your notes. The following are popular techniques to use.

• **Circle** new vocabulary and key terms and write out their definitions. Use the symbol =to show the words are synonyms.

• **Write questions** you have about the text.

• **Make connections** to your own knowledge and life experience.

• **Summarize main ideas** in only a few words.

• **Agree or disagree** with the text and make comments.

• **Number** the steps in a process, supporting details or examples, key points, and so on.

https://elt.oup.com/.../skills/q_skills_for_success

B. Read and annotate the Text 1 using at least five different annotation techniques.

C. Prepare a written synopsis of the text. A typical scientific report should comprise four basic narrative elements. Those elements are: *1) Title; 2) Introduction; 3) Main Body; 4) Conclusion*.

The generalized functions of the said elements are as follows:

■ *Title* - suggests the topic that follows, and can also be employed for advertising (as a slogan);

■ *Introduction* - states the topic of the article, or clearly outlines the topics to be covered;

■ *Main Body* - a series of paragraphs in each of which a separate subject is developed in detail; Main Body can include two streams: main issues arisen by other authors, and your (narrator's) personal attitude;

■ *Conclusion (Summary)* - sums-up the topic and/or offers an opinion, comments, recommendations, etc.

Given below are the offered sets of introductory constructions that may be recommended for the application in the respective parts of your presentation (report) scheme.

a) Introduction
- The text (article) points out …; - The author believes …; - The major point is …;
- The key-stone here is …; - The purpose / aim / intention of the report is to …;
- This is the paper concerning …
- This article contains / outlines / examines / assesses …

b) *Main Body*

- To state main issues arisen in the text:

- The first thing to be mentioned in this connctation is …;
- The text starts with the assumption that …; - To begin with, …; - First of all, …;
- Secondly / Then, …; - Thirdly / In the third place, …;
- Lastly / Last but not the least … .

- To note or declare (your) personal attitude:

- As I see it, …; - That goes without saying that …; - As far as I can judge, …;
- I would assume that …; - My opinion here is as follows: …;
- From my point of view, …; - Personally, I believe that …;
- To my way of thinking, …; - I am inclined to consider that … .

c) *Conclusion*
- On the basis of the points mentioned above, it would seem that …;
- It is therefore considered / obvious / recommended that …;
- To sum-up …; - Summarizing the foresaid, …;
- Taking everything into account, …; - In conclusion we should reconfirm that …;
- On the whole, …; - Finally, … .

Prepare and make a presentation, where you could report your research work.

Use the Report-Scheme and the following brief Presentation Outline.

PRESENTATION OUTLINE

1) I would like to present …
2) It is produced (manufactured, imported, etc.) by [company] in [country]…
3) The basic (principle) features of it are …
4) The very special merit (advantage, etc.) of it is in …

5) The implement (machine, etc.) is designed for the following operations (working conditions, etc.) …
6) You should bear (keep) it in mind (take it into consideration) that the cost of this implement (machine, etc.) is quite reasonable …
7) We could also offer these sets of additional equipment that perfectly match and upgrade the working field characteristics of our installation (machine, etc.): …

VOCABULARY

1. Guess the meaning of the word-combinations underlined in the text.
Make your own sentences with them.

2. Put the letters in the correct order to make nouns. The first letter is underlined.

1. urponcidot — production
2. actnmaioeznih — _____
3. gamfnir — _____
4. uoncpirdto — _____
5. ilfde — _____
6. yduitsrn — _____
7. scklt ioev — _____
8. chemvarin — _____

GRAMMAR

Look through the text in order to find sentences in the Passive Voice. Translate them into Russian. Then make negative forms of these sentences. Rewrite them as questions.

WRITING

1. Look through the text in order to find and copy to your notebook its parts which answer these questions:

a) Какая главная цель поставлена Генеральной Ассамблеей Организации Объединенных Наций?

b) Как можно охарактеризовать американское сельское хозяйство последних лет?

c) Чем было обусловлено повышение производительности труда между 1917 и 1945 гг.?

d) В чем разница между американскими и британскими хозяйствами?

e) Каков ежегодный рост производительности труда в сельском хозяйстве США в настоящее время?

f) Каким будет правильно организованное сельское хозяйство в будущем?

SPEAKING

Present the annotation you have made to your group mates orally. Expressing your ideas use the following speech patterns:

First of all …; In my opinion …; I suppose …; Data prove …; Both theory and experience show …; Considering (…) we may note that … .

UNIT 2. AGRICULTURAL MECHANIZATION IN CANADA

STARTING UP

Discuss these questions

What do you know about Canada and its agriculture?

Do you know anything about mechanization in Canada?

1. Read and translate these words and word combinations into Russian.

Acre, climatic, combine, economic, effective, geographical, management, marketing, product, physical, progress, sociological, tractor, type.

2. Complete the chart below. Translate.

Noun	Verb	Adjective
	effect	
management		n/a
		economic
climate	n/v	
advent	n/v	
	mechanize	
		farm
		practical
	product	

READING

Read the text

Mechanization in Canada has dramatically reshaped the agricultural landscape since the time of early settlement. It derived from two quite separate sources. One was the economic drive for greater productivity particularly in western Canada by greater acreage of land per farm unit. The other was the reduced farm labour supply which became very acute during World War II when an increase in production was required.

Some of the earliest mechanical innovations in agriculture involved the replacement of draft animals with the steam engine power, which was replaced by the internal combustion engine. The most important factor in the mechanization of Canadian farms has been the continued increase in the use of farm tractors. Lots of specialized machinery and other power units have been designed not only to reduce the actual man-hours of labour required in the production, management, and marketing of farm products, but also to reduce the physical labour needed for these same operations.

With the advent of large four-wheel-drive tractors, along with their accompanying equipment such as the air drill, individual farmers were able to plant, harvest, and maintain a

sizable acreage. As tractors evolved, so did small machinery and equipment that worked in concert with tractors. These technologies have allowed for a further decrease in labor demand from individual farmers. Some of the equipment had complementary features and could be used for both livestock and crop production enterprises. This has enabled producers to diversify into both livestock and grain operations.

One of the main areas of field mechanization has been in the harvesting of crops. Here the combine has been the major implement. At the present time in the cash crop areas of Ontario there is one combine for approximately every 80 acres of combinable crops. In Saskatchewan and most other areas of Canada this is one combine for approximately 365 acres. Although the combines in western Canada are much larger and in recent years the biggest percentage purchased have been the large self-propelled type, there is a definite trend to self-propelled machines in the east.

Although mechanization of field crops has been a major advancement in Canada, mechanization on the farmstead and in production practices for the handling of livestock has also made great strides. The number of animal units handled per man has tripled in most areas of Canada during the past 20 years.

Two major developments have been primarily responsible for this change. The first one has been the change in livestock management. Loose housing and self-feeding of all types of livestock have developed greatly in all areas in recent years which has very materially reduced the man hours required for chores related to these operations. The second factor has been the increased utilization of electrical power in farmstead operations related to bulk feeding, milking chores, manure handling, processing grain, and many other items.

Mechanization has been one of the important factors in improved crop production that has occurred in most areas of Canada. The yields of wheat and oats have increased by 20 to 35 percent. The use of tractors and power machinery makes possible more timely, more rapid, and more efficient tillage, seeding, and fertilizer operation which capitalize on a longer growing season and best climatic conditions. Improved tillage and spraying machines and methods give more effective weed control and better soil moisture conditions. More efficient and greater capacity harvesting machinery makes harvesting operations more timely with a maximum net return of high quality production.

COMPREHENSION

1. Answer the questions.

1. What two main sources influenced the mechanization in Canada?

2. What was the most important factor in the mechanization of Canadian farms?

3. What type of machine is used during the harvesting time in the eastern part of Canada?

4. Has the number of animal units handled per man increased or decreased in Canada during the past 20 years?

5. What major developments affect this change?

6. How has mechanization improved crop production?

2. Complete the sentences using information from the text.

1. The most … in the mechanization of Canadian farms has been the continued increase in the use of farm tractors.

2. Power units have reduced the physical labour needed for … .

3. At the present time in … of Ontario there is one combine for approximately every 80 acres of combinable crops.

4. The number of … handled per man has tripled in most areas of Canada during the past 20 years.

5. The first mechanization development has been the change in … .

6. The yields of … have increased by 20 to 35 percent.

VOCABULARY

1. Find agricultural terms in the text. Translate them into Russian. Make your own sentences with them. Compare your sentences.

2. Find Russian equivalents.

1. cash crop	a. рабочий скот
2. farm product	b. тип почвы
3. animal unit	c. ведение животноводческого хозяйства
4. self-propelled machine	d. подготовка почвы к посеву
5. draft animals	e. опрыскиватель
6. tillage	f. сельскохозяйственная культура, выращенная на продажу
7. soil type	g. условная единица поголовья скота
8. livestock management	h. сельскохозяйственный продукт
9. spraying machine	i. ландшафт
10. landscape	j. самоходная машина

GRAMMAR

1. Find sentences in the text used in Present Perfect. What Voices are they used in?

2. Rewrite these sentences in Past Perfect and Future Perfect. Translate them.

1. The combine has been the major implement in harvesting.

2. Loose housing and self-feeding of all types of livestock have developed greatly in all areas in recent years.

3. The rate of progress has been affected by soil type and cropping practices.

4.Mechanization has been one of the important factors in improved crop production that has occurred in most areas of Canada.

5. These technologies have allowed for a further decrease in labor demand from individual farmers.

SPEAKING

Give a two-minute talk on comparing American and Canadian mechanization in agriculture.

UNIT 3. SOME GLOBAL CHALLENGES OF AGRICULTURAL MECHANIZATION

STARTING UP

Discuss these questions

They say that some agriculture-related problems are 'international'. What 'international' agricultural problems can you think of? Discuss these 'international' agricultural problems with your group mates.

VOCABULARY

1. Read and translate these words and word combinations into Russian.

Automation, automatic conveyer, intensification, marketing, proportion, personnel, problem, situation, serious, specialization, specialized, system, technique.

2. Match the words and word combinations. Study both their oral and written forms.

1. to contrive	a. преграда, препятствие
2. cereals	b. обращаться, управляться
3. to handle	c. умудриться, найти способ (сделать что-то)
4. aerial top-cropping	d. себестоимость
5. fallow	e. примыкающий
6. large-scale machinery	f. доход
7. adjacent	g. прибыль
8. production costs	h. рутинная, утомительная работа
9. alternation	i. многофункциональная техника
10. chore	j. «пар», период «отдыха» поля
11. obstacle	k. подкормка с воздуха
12. income	l. зерновые
13. profit	m. севооборот, чередование с/х культур

READING

Read the text

In the 21st century, agriculture increasingly represents a crucial sector for the sustainable development of the planet. It is facing great challenges that test the global agricultural supply's ability to meet the growing food demand. In this context, it is clear that agricultural mechanization, as an indispensable factor of production for all types of agriculture and the main vector of innovation, is a major element in responding to these challenges.

Mechanization is a key input in any farming system nowadays. It aims to achieve the following: increased productivity per unit area due to improved timeliness of farm operations; an expansion of the area under cultivation where land is available; accomplishment of tasks that are difficult to perform without mechanical aids; improvement of the quality of work and products; a reduction of drudgery in farming activities, thereby making farm work less unattractive; etc.

It is evident that agricultural mechanization is able totransform the lives and economies of millions of rural families. For example, it can facilitate increased output of higher value products while eliminating the drudgery associated with human muscle-powered agricultural production. Improved livelihoods for smallholder farmers means increased access to input supply chains and integration in modern food systems, resulting in improved incomes, numerous and renewed business opportunities, further value addition and overall

improved livelihoods for smallholder families. Moreover, agricultural mechanization in its broadest sense can contribute significantly to the sustainable development of food systems globally, as it has the potential to render post-harvest, processing and marketing activities and functions more efficient, effective and environmentally friendly.

New Zealand farms contrive to achieve a high output per man by making the best use of their pasture and climate, and generally providing each worker with as much equipment as he can handle for doing time-consuming chores such as milking. There is only one worker to about 155 acres (60 ha) of farm land. Extensive use is made of advanced techniques, e.g. aerial top-dressing, in order to improve the production from areas that are difficult or impossible to deal with by tractor power. This work, as with aerial top dressing and straying in the USA, is carried out by contract services. The further mechanization progresses into such specialized fields, the more impossible it became for family farmers to carry out the work with machinery of their own.

Several countries of Eastern Europe and the USA are of particular interest from the viewpoint of mechanization, on account of their efforts which have been undertaken to employ nationally planned policies, through a system of very spacious state, business-owned and/or private farms. Such policies clearly permit rapid introduction of large-scale high-power machinery, and can create the virtuous cycle of higher incomes leading to more savings, higher demand for mechanization services and lead to greater productivity.

Further increase in animal productivity is achieved both by the introduction of new machinery and by wider automation of various processes on livestock farms in the industrialized countries. Many farms are using now automatic waterers which provide water to livestock at all times; at the press of the button, silage unloaders remove the food stuffs from the silo and drop it into the conveyer that carries the silage to the feed troughs.

One of the basic principle obstacles to economic agricultural mechanization in many countries is particularly small size of farms. Though this is a quite serious problem in Britain, the situation in many countries of Western Europe is far worse, a high proportion of the farm being too small to provide a reasonable income for the occupiers in modern conditions. This is also one of the major problems in many other parts of the world, where farmers are also left face to face with the lack of skilled personnel and undeveloped techniques.

Fostering the further development of the agricultural mechanization has the potential not only to increase the manufacturing base for agricultural mechanization in Europe, but also to provide the opportunities for more collaboration among manufacturers, dealers and institutions around the world. Private sector development can support smallholder enterprises

at field level where farmers provide mechanization services (hire services) to other famers. This can expand not only farm yields, but also the demand for vehicles, equipment and tools at national level, creating a mutually reinforcing virtuous circle.

COMPREHENSION

1. Answer the questions.

1. What are the main economical problems which are closely connected with farm mechanization and automation of agricultural operations?

2. What kind of techniques is used in aerial top-dressing?

3. Do nationally planned policies clearly permit rapid introduction of large-scale high-power machinery?

4. How does animal productivity increase?

5. What are the disadvantages of small farms?

2. Read the text again and decide whether these statements are true or false.

1. Farm mechanization cannot facilitate increased output of higher value products. **TRUE/FALSE**

2. New Zealand farms achieve a high output per man by making their climate better. **TRUE/FALSE**

3. The employment of nationally planned policies in several countries of Eastern Europe permit rapid introduction of large-scale high-power machinery. **TRUE/FALSE**

4. On the one hand, further increase in animal productivity is achieved by the introduction of new machinery. **TRUE/FALSE**

5. Particularly large size of farms is a quite serious problem in Britain and in many countries in Europe. **TRUE/FALSE**

VOCABULARY

1. Complete the sentences using word and word combinations below.

Techniques, contract services, labour productivity, productivity, intensification and specialization, skilled personnel, intensification, machinery.

1. Some economic problems associated with agriculture are … of agricultural production, labour productivity, farm planning and management and others.

2. Aerial top dressing and straying in the USA is carried out by … .

3. The employment of nationally planned policies leads to agriculture's … and … .

4. Further increase in animal … is achieved by the introduction of new … .

5. In many countries of Western Europe farmers are left face to face with the lack of … and undeveloped … .

2. Guess the meaning of the terms underlined in the text. Provide as many their antonymous, as you can think of. Make your own sentences with them.

Grammar

1. Translate these prepositions into English and find the sentences in the text with them.

С, для, в, на, с помощью (посредством)

2. Fill-in the gaps in the sentences given below with the prepositions 'with' (2), 'for' (3), 'in' (3), 'at' (2), 'of' (3), 'to' (2), 'past', 'from'.

1. I work … John Deer. A lot … foreign companies are interested … doing business … Russia. We have made some contracts … diesel engines lately. Our engines are … great demand nowadays and we sell them … high prices.

2. On Monday Mr. Rays … Case International came … Moscow to have the negotiations … our company. He phoned our secretary and made an appointment … our top manager … the next day.

3. John Deere's agent arrived to see us … half … eleven this morning. We discussed a lot … different questions. Our terms … payment and delivery were acceptable … their company.

WRITING

Look through the text again and fill in the table below. Choose the regions and indicate favorable and adverse factors and tendencies that influence agricultural mechanization in there. For more information you can use the Internet.

Region	Favorable Factors	Adverse Factors

SPEAKING

Work in pairs. Make up a dialogue about global challenges of agricultural mechanization. It should be at least 15 full-size replicas long.

UNIT 4. MODERN FIELD MACHINERY

STARTING UP

Discuss these questions

What agricultural machinery and field implements can you name?

What tasks are agricultural implements designed for?

Why is it important to keep farm equipment in top mechanical condition?

VOCABULARY

1. Read and translate these words and word combinations into Russian.

Automated, dealers, efficiency, innovations, investments, management, practice, planning, progress, production.

2. Match the words with the definitions.

1. dealer	a. a large area of land in the country that is owned by a family or an organization and is often used for growing crops or raising animals
2. estate	b. an insect or small animal that is harmful or damages crops
3. pest	c. damage or deterioration sustained from continuous use
4. income	d. the action or process of investing money for profit
5. investment	e. a person who trades in something
6. acreage	f. a unit for measuring area, equal to 4,047 square metres or 4,840 square yards
7. wear out	g. the state or quality of being efficient
8. efficiency	h. money received, especially on a regular basis, for work or through investments

READING

Read the text

Mechanization of agriculture in the twentieth century helped to dramatically increase global production of food and fiber to feed and clothe a burgeoning world population. While mechanization increased output and relieved some of the drudgery and hard work of rural life, it also created unintended consequences for rural societies and the natural environment. Now farm tasks can be done more rapidly and with better quality even when weather and soil conditions are the least favourable, and, then, modern machinery enables crops to be planted, cultivated and harvested in a considerably shorter time than in the past, and the same is largely true in case of livestock production operations.

Since the mid-20th century field machinery and implements have been improved from being horse driven to being tractor mounted. Since the introduction of tractors in agriculture growing size and capacity has been a key point of development till now. Over the time, tractors and implements have been more advanced by launch of sensors and digital display of settings. Furthermore, control of central parameters has been applied. From an engineering point of view tractors and combine harvesters are more up-to-date than different implements. For outsiders, a tractor today looks like an up-scaling of the old versions. When looking more closely, you realize that the tractor of today is a result of considerable evolution due to the overall performance. The different elements are optimized by adoption of most recent

components and engineering technology. This involves the hydraulic lift system, drive, gearing, combustion engine. All elements are controlled by modern technology.

What used to be done by hand is now managed at scale by giant machine. And that equipment is expensive – equivalent to the price of a small house. A mid-ranged tractor is worth over $100,000. New, elaborate computer systems afford the kind of precision and predictability that farmers 20 years ago could not have even imagined. But they have also caused new problems. There are some disadvantages of the replacement of manual labour with machines and automated equipment. First of all, farmers must have more capital in disposal to be engaged in farming because of the inevitable need in large investments in farm machines and other equipment. When modern agricultural equipment breaks or needs maintenance, farmers are dependent on dealers and manufacturer technicians—a hard pill to swallow for farmers, who have been maintaining their own equipment since the plow. Second, farmers must have a larger and more stable income to have electricity and fuel bills paid. Finally, small farms are destined to disappearing, for larger ones are of apparent advantage today.

Using larger machines reduces labour costs since they complete the job faster. But while larger tractors can cover more acreage than smaller ones, they also have higher overhead costs. Smaller tractors have less capacity and may cause delay in key field operations, resulting in a lower crop yields. Some of the time lost in doing field work cannot be cut, prevented or eliminated. Other lost time can be substantially reduced by careful planning and good management.

Most manipulations involve several different crops with specific tillage, planning, pest control and harvesting requirements. Ideally, each crop should have its own set of specialized implements to produce maximum yields. More equipment in turn means higher overhead costs. Lack of adequate equipment can delay getting crops planted or harvested in time, reducing yields and product quality. Thus, the most crucial progress, now seen on many farms, is in combining various operations and universal plant-species treatments in one machine. For instance, this has been done in the combine for harvesting and threshing wheat and other grains, and in the grain drill that in one trip over the field does the work of preparing the seedbed, planting seed and applying fertilizers and herbicides. Garden tractors are designed primarily for light estate duty and are not intended for continuous heavy tasks.

It is important to manage machine properly. This management includes planning the use of machinery for timely and productive operations, selecting proper types and sizes, replacing worn-out machinery at the right time.

Keeping farm machinery in top mechanical condition is also very important and it is one of the best ways to improve field working efficiency. Machines should be technically maintained properly, i.e. serviced regularly and adjusted correctly. Neglecting this can result in expensive repair procedures or cause complete overhauls.

COMPREHENSION

1. Answer the questions using the practical speech combinations from the following list.

To my mind…, As far as I understood …; The matter is following …; I'd like to tell you that …; No doubt …; The most fascinating about it is … .

1. What are the advantages of farm mechanization?
2. What does the use of larger and more advanced equipment result in?
3. What are the disadvantages of farm mechanization?
4. What equipment is to be used to produce maximum yields?
5. Why is it important to keep farm machinery in top mechanical condition?

2. Complete these sentences, supplying them with the corresponding facts from the text.

1. The use of larger machines reduce labour costs, but …
2. Ideally, each crop should have its own set of specialized implements, but …
3. Most of the larger tractors are manufactured in the United States, but …
4. Some of the time lost in doing field work cannot be eliminated, but …
5. Smaller tractors have lower …
6. Most operations involve several different crops with specific …
7. Proper agricultural equipment management includes …

VOCABULARY

1. Find Russian equivalents.

1. disadvantages	a. ремонтировать
2. equipment	b. трудовые затраты
3. labour costs	c. оборудование

4. product quality	d. управлять, осуществлять руководство
5. complete overhaul	e. проводить техническое обслуживание
6. to maintain	f. недостатки
7. income	g. пашня
8. to repair	h. капитальный ремонт
9. to manage	i. качество продукта
10. seedbed	j. прибыль, доход

2. Translate the words in brackets into English.

1. It is important to (управлять) machine properly. 2. Ideally, each crop should have its own set of specialized implements to produce maximum (урожая). 3. More (оборудования) in turn means higher overhead costs. 4. Garden tractors are designed primarily for light estate duty and are not designed for (непрерывной) heavy work. 5. Neglecting this can result in expensive repair procedures or cause (капитальному ремонту).

GRAMMAR

1. Find in the text the examples of the Infinitive. Make your own sentences with them.

2. Read and translate the dialogue, paying attention to the Complex Object constructions.

A: Good morning, Dr. Bruce.

B: Nice to hear you again, Mr. Allen. I wonder if I could make arrangements with you about new tests of the livestock feeding equipment we are buying from you.

A: Certainly, you can. This is just what Mr. Evans wanted me to talk to you about. When would you like us to have the tests made?

B: Well, as soon as possible. But I'd like you to make a few wear-sustainability tests of the frames as well.

A: This is just what we are going to do now.

B: I think there are some defects in the engine too. The quality of the conveyer belts isn't quite up to standard either.

A: Isn't it? Then we'll try and do our best to improve it. Is there anything else you want us to replace?

B: No, nothing but the engines and belts. The rest is just fine. I'm glad that you are so easy to deal with in terms of testing. Thank you. See you soon.

A: It is our pleasure to assist such loyal clients. Good-bye.

WRITING

1. Scan the text one more time in order to find and copy to your notebook the answers to the following questions:

1) Какие преимущества механизации сельского хозяйства?
2) Какие недостатки замены ручного труда машинами?
3) К чему ведет недостаток оборудования в сельском хозяйстве?
4) Какие факторы увеличивают накладные расходы?
5) Что может привести к необходимости капитального ремонта оборудования?

SPEAKING

Looking towards the future to a point in time when humans are removed from field machinery, prepare a presentation of ***any farm machinery of future***. You are allowed to use any available sources of relevant information, including Internet, specialized journals, and the assistance of your Agricultural Mechanization Department professors and other agricultural specialists.

UNIT 5. TRACTORS USED IN FARMING

STARTING UP

Discuss these questions

1. What do you think what is the most popular agricultural machine?
2. What are the most popular tractors in Russia and in foreign countries?
3. What types of tractors do you know?
4. Have you ever worked on a tractor? How does it work?

VOCABULARY

1. Read and translate these words and word combinations into Russian.

Agricultural, cultivating, hydraulic, industry, machinery management manufacturers, transporting, vibration.

2. Find Russian equivalents.

1. mounted	a. привод
2. drive	b. ведущие колеса
3. gear box	c. сгорание
4. lock differential	d. сзади
5. power steering	e. коробка передач
6. power take-off	f. тяговый, тянущий
7. driving wheels	g. рулевое управление с усилителем
8. trailed	h. отбор мощности
9. at the rear	i. блокирующийся дифференциал
10. combustion	j. прицепной
11. tractive	k. навесной

READING

Read the text

A tractor is a type of vehicle that is particularly constructed to efficiently deliver a tractive effort at a slow speed. The word tractor was taken from a Latin word that means “to pull”. Tractors are special vehicles which are aimed to provide the hauling of trailers and other types of machinery which are used for agricultural and construction purposes. The history of tractor development is really long. The first use of an internal combustion engine in a tractor in the United States goes back to1890. Today tractor construction industry is highly developed in many countries. Different types of tractors are being produced for various agricultural tasks on soil and in the livestock barn. Both wheeled and crawler tractors are of great importance in farming all over the world.

The engine is the heart and soul of any tractor. When they were first invented, tractors used steam engines, which were notoriously unreliable, not to mention dangerous. Since the 20th century, however, tractors have used internal combustion engines that run on a variety of fuels, from kerosene to ethanol and gasoline. Most modern tractors today run on diesel and biodiesel. These powerful engines typically range in size from 18 to 575 horsepower, giving

them all of the incredible power they need to tackle any job on today's farms. In recent years the diesel engine has become the accepted power unit for all British tractors. The most important development in tractors is the increase of engine capacity. Wheeled tractors in the 100 horse-power (hp) class have been introduced by most of the British and other countries' tractor manufacturers, and are increasingly used. Perfect examples here are *John Deere 5310N,Lamborghini Campion 135, MF 6290* and *Renault Ares 640RZ.*

A 200-300 hp tractor, like *Fendt Farmer 300LS* or *John Deere 8850*, can be named as the main power source for large farm operations in agriculturally developed countries. Most tractors employ two larger driving wheels at the rear and two smaller driven wheels at the front. But with the increase in engine power, four-wheel-drive ones have become common. Large tractors are mostly used for a limited range of operations, like tillage, combined tillage and sowing and yield harvesting.

Safety rules, designed for the protection of a tractor operator, require most new tractors to be fitted with safety cabs; and other rules are leading to the necessity to reduce the intensity of noise at the driver's ear in the cabs. Drivers' seats are also being improved to reduce injuries caused by excessive vibration.

It has now become normal practice to provide electric starting, lights and light-signaling. Other developments that have rapidly become common include such items as multi-speed gear-boxes, power take-off (PTO), lock differential, power steering and various devices for transferring weight from mounted implements to the tractor's driving wheels.

Most modern farm tractors are truly "all purpose". *Case Steiger 9390* and *Valtra Valmet 8150 HiTech* can operate a range of mounted, semi-mounted, and trailed implements and machines, and have hydraulic devices to provide easy and accurate control of the equipment from the tractor driver's seat. Among the typical operations performed by the latest tractors are plowing, cultivating, harrowing, sowing, harvesting and transporting agricultural crops, livestock and poultry feeds distribution, barn cleansing and others.

Inefficient machinery management is still one of the considerable problems, too. Some researches show that many farmers in America, having large tractors, only use them 400 hours per year or even less, while smaller tractors are long proved and recommended to be in use 1000 or more hours - and still doing good work. Farmers should not purchase larger tractors than they need, since heavier machines consume far more fuel which make them uneconomic. In addition, the area of land must be spacious enough in order to employ such tractors properly, which is not sometimes the case in the USA.

COMPREHENSION

1. Answer the questions.

Answer the questions resorting to the useful speech combinations from the following list.

I know only that …; I believe that …; I'd like to tell you that …; If I've got that right …; f I'm not mistaken, … What is more, … .

1. What are the tractors aimed to?
2. When was the first internal combustion engine used in the USA?
3. What popular British farm tractors can you name?
4. How do manufacturers comfort the driver's work?
5. What auxiliary electrical and mechanical devices is the modern tractor provided with?
6. What can "all purpose" tractor operate?
7. Why is it uneconomic to buy large tractors?

2. Read the text again and decide whether these statements are true or false.

1. Large tractors tend to be used for a wide range of tasks.

TRUE/FALSE

2. In recent years the diesel engine has become the accepted power unit for all British tractors.

TRUE/FALSE

3. Drivers' seats are also being improved to reduce injuries caused by excessive noise.

TRUE/FALSE

4. Most tractors employ two larger driving wheels at the rear and two smaller driven wheels at the front.

TRUE/FALSE

5. With the increase in engine power, four-wheel-drive tractors have become common.

TRUE/FALSE

VOCABULARY

1. Read the definitions and guess the words (Use a dictionary).

1. t.l…e	a. the preparation of land for crop growing
2. s..ing	b. to plant seeds in ground
3. c.b	c. the driver's compartment in a lorry, bus, tractor or train
4. f..l	d. material such as coal, gas, or oil that is burnt to produce heat or power
5. h…e-p…r	e. a unit used to measure the power of engines
6. w…l	f. a circular object that revolves on an axle and is fixed below a vehicle or other object to enable it to move over the ground

2. Make your own sentences with the words from exercise 1 of Vocabulary.

GRAMMAR

1. Scan the text one more time and find all the sentences with Participle II and make sentences.

2. Translate the following word combinations into Russian.

Developing industry / developed industry; changing distances / changed distances; a controlling device / a controlled device; an increasing speed / an increased speed; a transmitting signal / a transmitted signal; a reducing noise / a reduced noise; a moving object / a moved object; heating parts / heated parts.

3. Open the brackets using Participle I or Participle II.

1. You can measure the force (act) on the body.
2. The force (apply) to the body was measured.
3. (Graduate) from the University, he began to work at an office.
4. The engine (test) required no improvement.
5. (Make) these experiments we can compare the weight of elements.
6. The substances (identify) were described in his report.
7. (Listen) to the lecture, students usually make notes.
8. There are several subjects (study) optionally.
9. A system is a good mixture of integrated parts (work) together.

10. Input is the information (present) to the computer.

WRITING

What mounted, semi-mounted, and trailed implements can you name?

Copy the table given below to your notebook, and fill it in. Discuss the results of your work with your group mates, adding up the table with more machines.

Implements		
Mounted	Semi-Mounted	Trailed

SPEAKING

Work in pairs. With your partner present a new model of a farm tractor. What agricultural tasks is it made for? Is it wheeled or crawler? What special features does it have?

UNIT 6. TECHNICAL RE-EQUIPMENT OF MODERN AGRICULTURE

STARTING UP

Discuss these questions

Why do farmers buy new equipment?

Is it a sure extra expenditure for farms to buy new machinery?

Can this cost be of advantage? And what are the new beneficial models that machinery manufacturers offer us today?

VOCABULARY

1. Read and translate these words and word combinations into Russian.

Agricultural engineers, agricultural production, automatic, civilization, colleagues, conveyer, maximum effectiveness, natural resources, specialists, technical, territories, technical base, technical and economic characteristics, technological processes.

2. Find the equivalents. The following words will be of use for you, especially when reading and translating the text. Study both their oral and written forms (Use a dictionary).

1. to channel	a. объединять, создавать
2. to consolidate	b. ожидать
3. per capita	c. всесторонний, комплексный
4. overall	d. выброс отработавших газов
5. to expect	e. фураж; разрабатывать рацион питания скота
6. emission	f. общий
7. to conform	g. направлять в нужную сторону
8. to fertilize	h. подчиняться
9. comprehensive	i. собственность
10. ownership	j. на душу населения
11. (to) fodder	l. удобрять

READING

Read the text

Now a farmer can cultivate on more than 2 acres of land with less labor. The use of planters and harvesters makes the process much easier. In agriculture, time and production are so important; you have to plant in time, harvest in time and deliver to stores in time. Modern agricultural technology allows a small number of people to grow vast quantities of food and fiber in the shortest period of time. The need for technical re-equipment of modern agriculture is becoming evident for the specialists and the community today, especially if the former is analyzed within the scope of current change in the population of the Earth, economic transitions in the developing countries, accompanied by meaningful structural modifications of agriculture worldwide. Land, like other natural resources, must be exploited and protected as a basis for life and activity of people living on the territories of this or that country, whatever the ownership of this land is (private, state, municipal, etc.).

In fact, if we take the world as the whole, tremendous amounts of money have already been channeled into agricultural production. Thus, technical base of the latter has been consolidated. To secure per capita increase of agricultural production it is necessary to raise the level of its overall mechanization, first and foremost being that of livestock and poultry farms. Some kinds of livestock equipment are almost completely automatic, including those used to provide water and forage, to collect and transport farm manure, remove silage from the silo and drop it into the conveyer that carries the fodder to the feed troughs. A cluster of machines is now required that would permit a better digestion of various feeds by livestock and poultry, such as grain grinders, feed mixers, forage cutters and blenders that increase the feeding value of grain, roughages and other feeds. These measures, along with the advanced meet and milk processing equipment introduction, allow meaningful increase of agricultural production.

Among the main tasks, agricultural engineers are expected to find an efficient solution for how to design and make vast series of productive mobile power systems − combine harvesters and high-capacity crop tractors, − those of smaller sizes and lower emission for the specific types of work in greenhouses and cattle-barns. Forage loaders, like New Holland LM 430, ClaasTeleporter 975 Plus or JCB Loadall 520-4, together with harvesting combines John Deere 2266 Extra and Axial-Flow Case 2300 Series answer these modern challenges, and easily compete in the farm market.

Then there is another requirement to be met: production of the entire set of machines and implements for those harvesters and tractors, which would feature technical and economic characteristics conforming to present-day demands. It is also thought necessary to organize the extended production of self-propelled windrow harvesters and at the same time to expand the production of combined and multipurpose soil cultivating, sowing and fertilizing machines, as well as the manufacture of new ones for application of hard and liquid chemical plant protection substances. Here we could name multiple-row harrow John Deere 680, flail chopper Deere 16A, forage blower Deere Vector and trailed forage harvester Deere 3970.

Having in mind the interests of successful advancement of our civilization, it is highly important to continue the re-tooling of agriculture on the basis of new technologies. Among the principle innovations to be introduced, it is worth mentioning computerization of agricultural machines, technological processes in agriculture and overall farming practice, to adopt programs that allow the most advanced tractors and implements to be more precise and less wasteful in the use of fuel, seed, or fertilizer. Orbiting space satellites can send reports on the crop conditions, direct field machinery (particularly harvesting combines and tractors),

provide the needed day-to-day weather forecasts, and net-link farmers who are isolated through circumstances and require constant connection with their colleagues, extension services, stock exchanges, etc.

Furthermore, it is recommended to pay close attention here to the advantages allowed by utilization of complex plastics for machine and construction element manufacturing, which could possibly offer cheaper prices for farm equipment. Moreover, there should be a considerable effort given to automating man-machine functions, such as adjusting a machine for maximum effectiveness of application. In the foreseeable future, some agricultural machines may be made capable of driving themselves, using GPS map sand electronic sensors. Even more esoteric are the new areas of nanotechnology and genetic engineering, where submicroscopic devices and biological processes, respectively, may be used to perform agricultural tasks in unusual new ways.

Finally, it is recommended to complete the comprehensive mechanization of the production of sugar beet, raw cotton and fiber flax, and that of the application of organic and mineral fertilizers and crop protection agents, to raise the level of mechanization of the production of vegetables, including potatoes, fruit, fodder, and livestock products.

COMPREHENSION

1. Answer the questions.

1. Why do we need technical re-equipment of modern agriculture?
2. What is necessary to secure per capita increase?
3. What are the main tasks of modern agricultural engineers?
4. What changes are possible in the foreseeable future?
5. What are the advantages of computerization of agricultural machines?

2. Put the words and word combinations in the correct order to make sentences. The first word of the sentence is in italics. Translate them into Russian.

1. Technology allows, to grow, of food and fiber, a small number of, of time, *modern* agricultural, people, vast quantities, in a shortest period.

2. Activity of people, natural resources, must be exploited, and, like other, as a basis for life, *land*, protected and.

2. Livestock, completely, kinds, almost, equipment, are, automatic, of, *some*.

3. *Among*, computerization, to be introduced, of, the, it is worth, principle, innovations, mentioning, agricultural machines

4. Production, necessary windrow harvesters, i*tis*, the, extended. to organize, of self-propelled.

VOCABULARY

1. Put the letters in the correct order to make nouns. The first letter is underlined.

1. mcatoatiu automatic
2. erncyeov _____
3. tonpimzucetario _____
4. znuioitltai _____
5. lgcuarulitra _____
6. eesgseohunr _____

2. Make sentences with the nouns you have found from exercise 1 of Vocabulary.

GRAMMAR

1. Find in the text all the sentences with Comparative Adjectives and translate them.

2. Translate from Russian into English.

1. Эта машина очень интересная, но та еще интереснее.
2. Мне не нравится зеленый цвет руля. Закажите мне черный.
3. Это кресло удобнее того.
4. Эти колеса шире тех.
5. Мои часы отстают, и мне пришлось купить новые.
6. Моя машина более экономична, чем твоя.
7. Его работа сложнее, чем ваша.
8. Мы хотели бы купить эти шины, хотя они дороже, чем мы ожидали.
9. На этом тракторе мы вспашем больше, чем на том.

10. Мы добрались до леса раньше, чем они.

SPEAKING

Your farm has purchased five new *John Deere* combine harvesters. You, as a mechanical engineer on a farm, are asked to instruct the workers and drivers all the safety rules of driving and utilizing the machines. You can use the following linking and introductory combinations from the list.

You should …/ should not …; Mind that …; Be particularly careful (with smth/doing smth) …; You are recommended …; Don't forget to …; The manufacturer advises that you …; Our farm's management insists that you …; Your maximum attention must be turned to …; According to the recommendations …; You must not …; Make sure that…; Remember (to do/not to do) … .

OUT-LINE OF THE STANDARD SAFETY INSTRUCTION (SSI)
(John Deere combine harvesters)

This information sheet lists some of the hazards arising from the use of combine harvesters (combines) and advises on how to use them safely.

HAZARDS:

- Operator's falling from the combine
- Contact with overhead power lines (OHPLs)
- Being run over
- Contact with the knife, reel or stripper rotor
- Being injured by the drive mechanism
- Dust
- Fires

DON'T:

- climb or reach into the grain tank unless all augers and the engine are stopped
- let people jump on or off your combine when it is moving
- work under an unsupported header; use the table-supports provided
- carry out maintenance with the engine running
- run the combine with the protection guards raised or removed
- allow children or unauthorized personal on the combine
- overload the machine

DO:

- stop the engine (and pocket the ignition key) before you clean the grain tank, carry out any work associated with it, or when working at the rear, inside or underneath the combine

- follow correct procedures for working under the header or transferring it on and off its transport trailer
- be particularly careful when reversing; make sure you can see what is behind you; hoot before starting the engine or reversing
- wear non-slip footwear and avoid wearing loose closing
- brake and turn cautiously on downhill and slopes
- be patient when working in laid crops or unfamiliar fibrous crops
- use your instruments and listen for impending blockages - avoidance is easier than clearing blockages
- close the cab door or use respiratory protective equipment, for the exposure to high levels of grain-dust causes ill health, which could include occupational asthma, grain fever, chronic bronchitis, allergic eye and nasal infections
- mind additional safety procedures which are laid down for combines fitted with yield measuring meters using an ionizing radiation source

UNIT 7. COMPUTER SIMULATION IN FARM MACHINERY DESIGN

STARTING UP

Discuss these questions

Give the definition of the word "simulation". How do you understand it?

Can we employ computer simulation for agricultural machinery design?

VOCABULARY

1. Read and translate these words and word combinations into Russian.

Design process, design engineering, dynamics, ideas and concepts, modeling, parameters, programmer, prototype, technology, user, virtual reality, visualization and animation.

2. Match the words with the definitions.

1. prototype	a. the branch of mechanics concerned with the motion of objects without reference to the forces which cause the motion
2. software	b. an original or first model of something from which other forms

	are copied or developed
3. simulate	c. the branch of mechanics concerned with the motion of bodies under the action of forces
4. kinematics	d. a person who writes computer programs
5. dynamics	e. the programs and other operating information used by a computer
6. programmer	f. produce a computer model of

READING

Read the text

Along with technology development, farm machinery is playing vital role in agricultural economy development. The farm machinery user does not only set requests to the product working efficiency, the structure performance, but he also wants its security, comfortableness.

In the recent years, it has become common knowledge that technical development moved towards the computer assistance ergonomics design technology, thus reducing product development periods and making the design process ever more efficient. Following on the heels of software advances which have brought engineering three-dimensional (3D) solid modeling, visualization and animation, the ability to simulate a product's functionality and bring it to life is now available.

John Deere, a leading producer of agricultural equipment, industrial equipment and power systems, believes that virtual reality technology allows its engineers to evaluate the ergonomic options of a piece of equipment before it becomes steel.

For design engineers, simulation can include kinematics, dynamics, stress and motion analysis and, most recently, functional simulation. Functional simulation is a part of the wider field of engineering simulation - the reproduction of the conditions of a situation by means of a model, for study, testing or training, etc. It can be defined as the mechanical simulation of a product's behavior.

The importance of simulating is doubtless, since an understanding of the working relationship between all parts, components, human operators and the terrain in which the machine is expected to operate is crucial. The majority of engineers would concur with this statement, and appreciate the ability to conduct in-depth real-time design for assembly, manufacturing and maintainability - something afforded by functional simulation software.

Visualization provides solutions of many design challenges encountered throughout the product life-cycle, from the evaluation of basic ergonomic issues. These digital virtual prototyping tools have been joined by animation devices that create motion or behavior of a product. And these parameters can be captured for unlimited replay.

Animation is a technology that makes a product come alive for the duration of the sequence and according to the imagination of the programmer. The product comes alive according to the wishes of the user at the time of interaction with the model.

Functional simulation addresses current down-stream problems (such as the necessity of the construction of a physical prototype and important discovery and correction of design flaws) much earlier in the design process, sharply reducing the cost and time required to correct them, while enabling engineers to evaluate a greater number of ideas and concepts.

COMPREHENSION

1. Answer the questions.

1. What does the farm machinery user request to?
2. What can you say about simulation?
3. Why the ability to simulate a product's functionality and bring it to life is now available?
4. Why is the importance of simulating doubtless?
5. When does the product come alive?

2. Translate the following word combinations from the text. Make your own sentences with them.

- vital role;
- engineering simulation;
- recent years;
- working relationship;
- product life-cycle;
- design challenges;
- down-stream problems;
- to come alive.

VOCABULARY

1. Find Russian equivalents.

1. to simulate	a. сталкиваться, натолкнуться

2. doubtless	b. земной
3. terrain	c. проблема; вопрос; выпуск (продукции)
4. crucial	d. запечатлеть; охватить
5. to encounter	e. воссоздавать в процессе проектирования, моделировать
6. to capture	f. открытие
7. discovery	g. решающий
8. issue	h. несомненный

2. Complete the sentences using words and word combinations *in italics*.

Kinematics, animation, physical prototype, ergonomic options, dynamics.

1. In the past, in the world of design engineering the point at which products came to life was generally during a **…** review.
2. Simulation can include **…,** stress analysis, **…,** motion analysis and, most recently, functional simulation.
3. **…**is a technology that makes a product come alive for the duration of the sequence and according to the imagination of the programmer.
4. Virtual reality allows its engineers to evaluate the **…** of a piece of equipment before it becomes steel.

GRAMMAR

1. Fill the gaps with particle *to* where it is necessary.

1) I'd like … dance.
2) She made me … repeat my question several times.
3) Do you like … go abroad?
4) We had … put on our overcoats because it was windy.
5) May I … use your pen?
6) I am planning … do some shopping.
7) What makes you … think you are wrong?
8) She wanted … speak to Nick, but could not … find him.

2. Translate into Russian.

1. To play chess was his greatest passion.
2. The child never liked to be washed.

3. Which is more pleasant: to give or to be given presents?

4. To improve your pronunciation you should record yourself and analyze your speech.

5. This is the book to be read during the holidays.

Writing

Prepare a written non-formal report conveying basic ideas of the text. The practical speech combinations given in the list below will help you.

Let me tell you this …; As I've got …; I'm sure to say that …; No doubt, …; It's common knowledge that …; I cannot say much about that, but what I know for sure is …;; As far as I am able to judge according to the text …; I'd like to be more specific about …; In principle, …; It was new for me to know that ….

Speaking

Work in pairs. Compare your ideas, make a dialogue discussing them.

Supplementary Reading Texts

Text 1. History of Tractor Development

Steam was the first source of power for an engine. James Watt, a Scottish engineer, improved the primitive steam engine and its peripheral devices for commercialization in late 18th century. A portable steam engine was used for thrashing in the USA in 1850s. That was not a self-mobile system. It was towed by animals. The first tractor with a steam engine was developed in the USA in 1858. The crawler type tractor with a steam engine was also developed in the USA in 1873. Cable plowing was a major work done by tractors at that time.

Since tractors were too heavy, plowing by mounting the plow directly on the tractor would have caused the machine to sink in the field. Therefore, two tractors placed at both ends of a field and with the plow swinging on a cable towed to both tractors were used for plowing the field by moving tractor from one end to the other. Tractor was also used as power source for thrashing.

In 1876, Otto first presented the theory of the four-cycle sparking ignition engine system in Germany. R. Diesel, a German, invented in 1893 the compression ignition engine system known as the “Diesel Engine”. The diesel engine had the advantages of a high constant load and slow engine traveling speed as compared to the gasoline engine. Because of this, in the early 20th century, power source of the tractor was rapidly changed from the gasoline engine to the diesel engine. However, at that time, the tractor was used for only drawing trailers or a power source for plowing and thrashing.

In 1922, R. Bosch invented the fuel pump system for the diesel engine in Germany. This innovative technology significantly improved the performance of diesel engines, resulting in higher power and a compact size. The tractors with the PTO (Power Take Off) shaft for the power driven implements became popular as a general purpose tractor for power-tilling, seeding and weeding in addition to plowing and thrashing. The standards of PTO were established by the ASAE (The American Society for Agricultural Engineers) in 1927.

The other two important innovative technologies regarding tractor development were the installation of the rubber air tire, and the hydraulic three-point hitching system. The rubber air tire was invented by J. Dunlop in 1877. The hydraulic three-point hitching system was invented by Massey Ferguson Company in Great Britain in 1935. Tractor became a multi-purpose vehicle for drawing trailers as well as driving mounted type agricultural implements. The installation ratio of the rubber air tires in the market of tractors had been more than 95 % until 1940.

Text 2.Technology Is Taking over the Agriculture

With rapid technological development, tractors have experienced the technological spotlight. In other words, simple tractors evolved into fully equipped machines that provide maximum comfort to a farmer. Improved and user-friendly driving consoles, together with large and air-conditioned cabins, have become integral components of modern tractors. At this point in agriculture, every improvement was oriented towards a farmer. Making farmer's life easier through modernization of farm machinery was the focus of machinery producers.

These improvements are just the beginning of the revolution in farm technology, which culminated with the occurrence of the GPS system. As one of the most utilized types of a satellite system, the global positioning system (GPS) enables accurate driving and

application in the field. Moreover, precise navigation with a GPS system marked the beginning of a new era in farm management, known as precision farming.

Agtech revolution, encouraged by the occurrence of the GPS system, continued with its strong development during the last few decades. Today, modern tractors include autosteering systems which enable automated and accurate guidance of a vehicle, thus minimizing field overlapping and underlapping. That way, the autosteering system allows a farmer to focus on managing a farm activity, instead of steering the vehicle.

Besides that, the agriculture has experienced a development of various sensors and remote sensing technology. Sensors are devices that measure various crop or soil conditions. On the other hand, remote sensing technology includes drones, satellites, and airplanes that use the sensors to obtain various information about crops and soil conditions from a distance.

By using farm sensors, attached to a remote sensing technology and in conjunction with a GPS system, a farmer can create soil maps. The process that enables creating maps about various soil and crop conditions (soil nutrient levels, pH value, pest occurrence, and others) is also known as geo-mapping. Sensors can also be attached to a tractor, combine or some other farming implement. For instance, yield mapping sensors installed on the combine, collect the data about the yield and other crop characteristics during the harvest.

Another revolutionary change in agriculture was the development of variable rate technology that provides the application of the right amount of inputs, in the right location on the field, and at the right time.

While the tractor passes over the field, the sensor gathers the data which can be processed in two ways:

- The data is immediately delivered to the farm equipment responsible for the application (i.e. agricultural sprayer)
- The data is delivered in the form of a soil map that needs to be processed before its further delivery to the farm equipment responsible for the application.

This means that inputs such as seeds, fertilizers, pesticides, and water can be distributed based on the requirements of each part on the field.

Besides aforementioned technologies, Wi-Fi connection has also revealed endless possibilities in farm management. Thanks to that, the device (mobile phone, tablet, computer) and the tractor, can easily become one farm management unit.

Parallel with the development of modern tractors and precision farming technology, other aspects of farm machinery have experienced the agtech revolution as well.

By expanding its technological boundaries, modern agriculture has become precise and data-driven.

This new angle of farming expands industry boundaries and brings a fresh perspective on all types of farm machinery, including the following: soil management implements; planters and sowing machines; agricultural sprayers; fertilizer spreaders; irrigation systems; combines; storage and packing facilities; drones and satellite imagery; farm management software. In other words, a simple tractor has evolved into a whole agtech system that is mutually interconnected with other technological aspects of farm management (including a weather station, irrigation technology, various farming implements, and finally, farm management software).

Regarding the fact that agtech is just heating up, the only question is: What the future brings? Robotic harvesters, in-door farming, self-driving tractors, farm management software, and many other new technologies are just about to start changing the way food is produced. The changes in agriculture are not happening slowly anymore. Technology is extending all boundaries. Now, it is up to a farmer to join the ride and keep up with all those changes in order to improve his farming.

Text 3. Biofuels

The past few years have seen tremendous growth in the use of biofuels to replace petroleum-based transportation fuels. Biofuels include ethanol, biodiesel, and alfalfa products.

Ethanol production has grown significantly. Current U.S. production is approximately 3 billion gallons (about 11.3 billion liters) of ethanol per year for use in cars and trucks. Many farmers own the ethanol-producing plants. Ethanol is a clean-burning, renewable product made from fermented agricultural products such as corn. Because ethanol contains oxygen, it provides a cleaner and more-efficient fuel than fossil fuel. When it is used in vehicles, it reduces carbon dioxide (a major contributor to global warming). Although ethanol does release some carbon dioxide when it is burned, the crops that produce ethanol recycle it. Many scientists believe it creates a greenhouse cycle where the gasses are used again by plants instead of remaining in the atmosphere.

In addition to corn, other crops are being experimented with as a source of ethanol in order to increase efficiency. Methods to convert cellulose (the fibrous matter in plants) into ethanol show the most promise for the future. Perennial crops, such as switch grass, are also candidates for the production of ethanol.

Biodiesel is a vegetable-based alternative to petroleum for diesel engines. It is a high-performance fuel that can be used in all diesel engines to significantly reduce harmful emissions. It is made from 80% to 90% vegetable oil and 10% to 20% alcohol. Biodiesel is a fuel produced from a chemical reaction between soybean oil, methanol, and lye. Waste grease (cooking oil) from cooking food can be used in place of soybean oil. Many restaurants contribute their used cooking oil to be converted into biodiesel. It can be used in its pure form or can be blended with petroleum diesel. Any percentage of biodiesel can be used, but 2% and 20% are the most common.

Biodiesel as a transportation fuel is becoming more common. It can also be used in emergency and remote diesel electric generators. An advantage of using biodiesel blended with petroleum diesel for backup power generation is that it reduces some of the harmful air emissions that are generated from petroleum diesel generators alone. Biodiesel can be used in all diesel equipment.

Over the past five years, the price of biodiesel has dropped, but it is still rather expensive compared to other fuels. Like ethanol, biodiesel also results in a net reduction in greenhouse gases. It is also completely biodegradable; less toxic than table salt; and less combustible, which makes it easier to handle, store, and transport. Biodiesel also lubricates the engine so it will last longer. In addition, it helps keep fuel lines, injectors, and combustion chambers clean.

Researchers are currently working with genetically engineered alfalfa to produce industrial enzymes. Enzymes are proteins that modify chemical reactions. They are used in many diverse industries and products, such as animal feeds, paper processing, and laundry detergent. One of the primary advantages of using alfalfa for producing industrial enzymes is that all of the residue left over after the enzymes have been extracted can be used for animal feed or even to produce electricity. Some researchers also believe that alfalfa enzymes may be useful for biopulping in the paper industry and toxic waste cleanup.

Currently, the USDA is experimenting with converting alfalfa into several different products. The leaves are being tested for use as raw, biodegradable plastic beads, industrial products, and better livestock feed. The alfalfa stems are being used in the production of ethanol.

In addition to plastics and fuel, alfalfa may be a renewable resource for replacing other petroleum-based products and nonrenewable resources, such as nitrogen and phosphorus fertilizers. This would be important in preventing fertilizers from polluting water. There are several advantages to using alfalfa. It can be harvested several times each growing season and

needs replanting only every four to six years. Alfalfa also replenishes the soil with nutrients and is easy

Text 4. Robots in Agriculture

By 2050, world population is expected to rise to nine billion, but the amount of arable land meant to grow food will remain mostly the same as it stands today. As such, a 25% increase in productivity is mandated to support not just a growing populace, but also a wealthier one – as income inequality is coming down in developing countries, we are also seeing a sharp increase in meat consumption, for instance. Genetically modified organisms and waste management are just a few paramount solutions. At the same time, productivity stems from agricultural processes and some modern farmers are already integrating the latest technology to increase their yields and cut costs. Twenty years from now, expect your oranges and corn to be 100% sown, grown and harvested by robots.

The agricultural industry is in transition. And that transition differs country by country, state by state, region by region as well as by type of farming practiced: from primitive to conventional to precision to experimental. While it is true in many places in the world farming is still made as it has been for thousands of years, through spade and spud, the general trend is to move farming towards high-tech. Many modern farmers and ranchers are already using digitized networks, sensors and autonomous devices for most aspects of agricultural functions from grafting to planting, from harvesting to sorting, packaging and boxing. Farmers use software systems and aerial survey maps and data to guide their field operations. They also use auto-steer systems included in many new tractors (or buy kits that do the same thing) which follow GPS and software guidance.

According to Queensland University of Technology (QUT) robotics Professor Tristan Perez, the farm of the future will be riddled with many lightweight, small, autonomous, energy-efficient machines called AgBots. Each with its own place and purpose, these bots will work together to weed, fertilize and control pest and diseases, all while collecting valuable data which can later be used to correct and improve the process.

The idea is to replace tractors (large, expensive and largely inefficient), with a swarm of cost-effective bots that can operate the farm around the clock. At QUT, engineers are currently working on the second version of their AgBot. The prototype robot is equipped with cameras, sensors and software, designed to work in autonomous groups to navigate, detect

and classify weeds and manage them either chemically or mechanically as well as apply fertilizer for site specific crop management.

Professor Perez said robots would be crucial to the future long-term productivity, profitability, and sustainability of farms.

How agbots will be used:

- Equipment manufacturers are developing tractors that use machine vision and autonomous robotics to replace traditional large, expensive and inefficient tractors.

- In the rules-oriented organic farming field, robotic weeding implements have been used to inspect crop rows and identify weeds rapidly.

- Robots operating at low speeds can detect weeds. Next-generation computer vision algorithms will be used to classify them.

- Robots are being used for harvesting and sorting, packaging and boxing.

- Other future applications include planting seeds, grafting plants, seeding clouds, analyzing soil and monitoring the environment.

Text 5. Agbots

An agbot, also called an agribot, is an autonomous robot used in farming to help improve efficiency and reduce reliance on manual labor. Future farms are expected to be tilled, sown, tended and harvested solely by fleets of co-operating autonomous robots called swarm robots that will weed, fertilize, control pests and diseases, all the while collecting valuable data.

Equipped with specialized arms, end effectors and other tools to perform a variety of agricultural tasks, agbots can connect to wireless sensor networks (WSNs) and with the help of drones, gather large amounts of data. Big data analytics will help farmers extract information from the vast amount of data to make farming more efficient and improve output.

The trend toward using agbots is supposed to increase exponentially to help alleviate a shortage of human farm labor. Today, robots for fruit picking, milking and sheep shearing have successfully done jobs that previously required human manual labor. Thousands of robotic milking parlors are in place worldwide, and mobile bots are helping dairy farmers automate tasks such as feed pushing and cleaning manure.

The use of robotics at dairy farms accounts for a substantial share of the market for robots and drones in precision agriculture, which IDTechEx researchers predict will grow from $3 billion in 2016 to $10 billion as early as 2022. In addition to being unmanned and

energy-efficient, IDTechEx predicts agricultural robots are apt to be slow (so that they can devote more attention to each plant), lightweight (to reduce soil compaction), and small (to keep costs down).

Some exciting innovations include:

Dairy Farming. Dairy makes up one of the most important aspects of U.S. farming – hundreds of millions of pounds of milk are produced throughout the country. However, it also offers its fair share of dirty and dangerous tasks. As part of the $1.9 billion dairy automation industry, robots have already been used to automate manure cleaning, feed pushing, and much more.

Autonomous Tractors. Virtually every major manufacturer of agricultural equipment has developed a tractor using machine vision and autonomous robotics in some fashion – or has one in the advanced planning stages. Autonomous farm equipment is capable of greater efficiency than manual equipment and can directly incorporate information shared wirelessly by drones.

Robotic Weeding. Automated farm equipment can be very helpful in the precise, rules-oriented world of organic farming. Robotic weeding implements have been used to inspect crop rows and identify weeds faster than human personnel. Soon, unmanned autonomous "weed-eaters" will be capable of roaming a property at will, identifying problem specimens, and eliminating them.

Fresh Fruit Harvesting. Many areas of fruit harvesting have already been fully mechanized. Still, there's much room for growth among delicate, fresh harvests. IDTechEx estimates that large-scale market adoption for today's strawberry and citrus-picking auto-harvesters will begin by 2021. The Wall Street Journal recently reported on successful use of the Agrobot in California strawberry fields.

Small and large farms alike stand to become more productive, efficient, and cost-effective than ever before. Friendly farmers are welcoming robots into their fields, and agriculture will never be the same.

Appendix 1.Grammar reference

1. *The Adjective* – Имя прилагательное.

Comparison – Степени сравнения прилагательных.

Имя прилагательное — часть речи, обозначающая признак предмета: ***fine* weather**– *хорошая погода;* ***sunny day*** *– солнечный день.*

Прилагательные имеют следующие степени: ***положительную, сравнительную и превосходную***.

Прилагательные	**Positive** (положительная)	**Comparative** (сравнительная)	**Superlative** (превосходная)
Односложные (состоящие из одного или 2 слогов)	big cold	bigg**er** cold**er**	**(**the**)** bigg**est** **(**the**)** cold**est**
Двусложные прилагательные, оканчивающиеся на **-y**	sunny happy	sunn**ier** happ**ier**	**(**the**)** sunn**iest** **(**the**)** happ**iest**
Многосложные (состоящие из 3-х слогов и более)	interesting expensive	**more** interesting **more** expensive	**(**the**) most** interesting **(**the**) most** expensive
Исключения	**good** **bad** **much/ many** **little**	**better** **worse** **more** **less**	(the) **best** **(**the**) worst** **(**the**) most** **(**the**) least**

2. *Present Simple* – Настоящее простое время

Present Simple употребляется, когда речь идет о:

• регулярно повторяющихся, повседневных действиях: *Farmers till the soil every year. – Фермеры обрабатывают почву каждый год.*

• постоянных состояниях, привычках: *Tomatoes have fleshy internal segments. – Томаты имеют мясистые внутренние доли.*

• непреложных истинах и законах природы: *Plants need nutrients for their growth. – Растениям для роста нужны питательные вещества.*

Positive			Question			Negative		
I You We They	live	in Kazan.	**Do**	I you we they	live in Kazan?	I You We They	**don't**	live in Kazan?
He She It	lives		**Does**	he she it	live in Kazan?	He She It	**doesn't**	live in Kazan?

3. *Past Simple Tense* – Простое прошедшее время

По способу образования утвердительной формы простого прошедшего времени все английские глаголы делятся на стандартные и нестандартные.

Стандартные глаголы образуют утвердительную форму простого прошедшего времени с помощью суффикса ***-ed***: work***ed***, start***ed***.

• Если глагол оканчивается на -e, добавляется: live**d**.

• Если глагол имеет только один слог, оканчивающийся на согласную, то последняя согласная удваивается: stop**p**ed.

• Если глагол оканчивается на -y с предшествующей согласной, то буква -y меняется на ***-ie***: study – studi***ed***.

Утвердительная форма простого прошедшего времени нестандартных глаголов дается после неопределенной формы и поэтому называется «второй формой глагола»: see – ***saw***, go – ***went***, do – ***did***.

Все глаголы в простом прошедшем времени имеют одну форму для всех лиц единственного и множественного числа.

I He/She/It We You They	worked went	yesterday.

Отрицательная форма простого прошедшего времени образуется с помощью ***didn't***.

He walk***ed***. − He ***didn't*** walk .

I He/She/It We You They	didn't (did not)	work yesterday go yesterday

Вопросительные предложения в простом прошедшем времени образуются с помощью ***did***.

She finished. - Did she finish ?

Did	she you they etc.	work? go?	Yes, I did. No, she didn't.

4. *Continuous tenses* – Времена группы *Continuous* (продолженные времена)

Времена группы Continuous обозначают действия, которые протекают (протекали, будут протекать) в точно указанное время, в определенный момент – в настоящем, в прошедшем и будущем. Дополнительными характеристиками таких действий является их незаконченность, динамичность, наглядность. **Любое время группы Continuous образуется по общей схеме:**

to be + Ving

(V — это основной глагол в начальной форме).

Таблица спряжения глагола *to work* ***(работать) в Continuous***

	УТВЕРДИТЕЛЬНАЯ			ВОПРОСИТЕЛЬНАЯ			ОТРИЦАТЕЛЬНАЯ		
PRESENT	I	**am**	working	**Am**	I	working**?**	I	**am**	**not** working
	He She It	**is**		**Is**	he she it		He She It	**is**	
	We You They	**are**		**Are**	we you they		We You They	**are**	
PAST	I He She It	**was**	working	**Was**	I he she it	working**?**	I He She It	**was**	**not** working
	We You They	**were**		**Were**	we you they		We You They	**were**	
FUTURE	I He She It We You They	**will be** working		**Will**	I he she it we you they	**be** working?	I He She It working We working) You They	**will not be** **(won't be**	

5. ***Present Perfect*** **– Настоящее совершенное время**

Настоящее совершенное время употребляется для выражения действия, законченного к настоящему моменту. Этот момент в предложении может быть выражен:

а) временем действия, которое может быть не указано.

He has read the book. − Он прочел книгу.

b) время действия указано при помощи наречий неопределенного времени : already (уже), never (никогда), ever (когда-нибудь), often (часто), just (только что), today (сегодня), this week (на этой неделе), since (с), for (в течение).

They have met today. − Они встретились сегодня.

Форма		
УТВЕРДИТЕЛЬНАЯ	**ВОПРОСИТЕЛЬНАЯ**	**ОТРИЦАТЕЛЬНАЯ**
You have translated the text.	Have you translated the text?	You haven't translated the text.
She has written a book.	Has she written a book?	She hasn't written a book.

6. *Past Perfect* – Прошедшее совершенное время

Прошедшее совершенное время употребляется для выражения действия, закончившегося к определенному моменту в прошлом или до действия в прошлом. Этот момент в предложении может быть указан:

a) словами, обозначающими время (by 3 o'clock yesterday – к 3 часам вчера).

They have studied the material by the end of the week. − Они изучили этот материал к концу недели.

b) Другим действием, которое произошло в прошлом и выражается глаголом в простом прошедшем времени.

We had translated the text, when our teacher came. − Мы перевели текст, когда наш учитель пришел.

Форма		
УТВЕРДИТЕЛЬНАЯ	**ВОПРОСИТЕЛЬНАЯ**	**ОТРИЦАТЕЛЬНАЯ**
They had studied the problem by 3 o'clock.	Had they studied the problem by 3 o'clock?	They hadn't studied the problem by 3 o'clock.

7. *Passive Voice* – Пассивный (страдательный) залог

Пассивный залог — это такой способ построения предложения, при котором внимание направлено на лицо или предмет, в отношении которого выполняется действие, т.е. подлежащее испытывает действие на себе. Это противоположно активному залогу, который сосредоточен на лице или предмете, выполняющем

действие: I **take** (я отвожу) – активный залог в настоящем времени; I **am taken** (меня отводят) – пассивный залог в настоящем времени. I **took** (я отвел) – активный залог в прошедшем времени; I **was taken** (меня отвели) – пассивный залог в прошедшем времени.

Пассивный залог **образуется по общей схеме:**

to be + V_3

(***V_3*** — это III форма основного глагола).

Таблица спряжения глагола *to take* ***(брать, взять) в Simple Passive Voice***

	УТВЕРДИТЕЛЬНАЯ			**ВОПРОСИТЕЛЬНАЯ**			**ОТРИЦАТЕЛЬНАЯ**		
PRESENT	I	**am**	**taken**	**Am**	I	**taken?**	I	**am**	**not taken**
	He She It	**is**		**Is**	he she it		He She It	**is**	
	We You They	**are**		**Are**	we you they		We You They	**are**	
PAST	I He She It	**was**	**taken**	**Was**	I he she it	**taken?**	I He She It	**was**	**not taken**
	We You They	**were**		**Were**	we you they		We You They	**were**	
FUTURE	I He She It We You They	**will be taken**		**Will**	I he she it we you they	**be taken?**	I He She It We You They	**will not be taken (won't be taken)**	

8. *Modal Verbs* – Модальные глаголы

Модальные глаголы в английском языке отличаются от остальных глаголов тем, что они не используются самостоятельно и не обозначают конкретного действия или состояния, **а лишь** показывают отношение говорящего к действию, т. е. возможность, необходимость, предположительность, долженствование, разрешение и т. д.

Модальный глагол и *его эквивалент*	Перевод	Прошедшее время	Будущее время	Выражает
can *to be able to*	мочь, уметь, быть способным	**could** *was/were able to*	---------- *will be able to*	1) способность, физическая возможность: I **can** speak English. – Я умею говорить по-английски. 2) просьба на совершение действия: **Could** I take your pen? – Могу я взять твою ручку? 3) запрет: You **cannot** go now. – Ты не можешь уйти сейчас. 4) разрешение: You **can** write here. – Ты можешь писать здесь.
may *to be allowed to*	можно, разрешить кому-либо	**might** *was/were allowed to*	---------- *will be allowed to*	1) разрешение, позволение: **May** I come in? - Можно мне войти? 2) возможность/невозможность совершения действия: It **might** rain.

				– Может пойти дождь. 3) упрек, неодобрение: You **might** change the fertilizers. – Ты мог бы сменить удобрения.
must (большая категоричность)	должен, обязан	----------	----------	Долженствование, необходимость выполнения чего-либо: You **must** visit her. – Ты должен сходить к ней.
should	следует, стоит, рекомендуется, должен	----------	----------	Рекомендации по совершению действия, совет: You **should** change the seeds. – Тебе следует поменять семена.
to have to – эквивалент глаголов **must** и **should**	приходится должен, вынужден	*had to*	*will have to*	Необходимость выполнения действия из-за обстоятельств: I **have to** add fertilizers. – Мне приходиться вносить удобрения.
to be to эквивалент глаголов **must** и **should**	должен, обязан	*was/were to*	----------	1) Неизбежность: I **am** to go. I will miss my train. – Мне нужно идти. Я опоздаю на поезд. 2) предварительная договоренность: We **are** to meet tomorrow. – Мы договорились встретиться завтра.

Особенности модальных глаголов в английском языке

• Не изменяются по лицам, не имеют окончания -s/-es **в третьем лице, единственном числе (кроме эквивалентов модальных глаголов:** *to have (to), to be (to)***:**

She can swim – Он умеет плавать. He must work hard – Он должен много работать. She has to get up early – Ей приходится вставать рано. – We are to meet at 10. – Мы должны встретиться в 10.

• При образовании вопросов и отрицаний не требуют вспомогательных глаголов. В таких предложениях модальный глагол сам выполняет роль вспомогательного: в вопросах он занимает место перед подлежащим, а в отрицаниях к нему добавляется частица *not* **(исключения:** *to have (to)* **употребляется в вопросах и отрицаниях со вспомогательным глаголом;** *to be (to)* **в вопросах употребляется перед подлежащем в соответствующем лице и числе (***am/are/is***) и добавляет частицу** *not* **в вопросах).**

May we go for a walk? – Мы можем идти гулять? Can I help you? – Могу я помочь? What should I do? – Что мне следует сделать?

He can't dance – Он не умеет танцевать. You mustn't smoke – Ты не должен курить. You shouldn't sit here – Тебе не следует сидеть здесь.

Does he have to get up early? – Ему приходится вставать рано? Are we to meet inside? − Мы встречаемся внутри?

• Не имеют неопределённой формы глагола (инфинитива) а также -*ing* **форм.**

• После них не употребляется частица *to* **смыслового глагола (кроме эквивалентов** *to have (to), to be (to)***:** I **can** swim. – Я умею плавать. You **should** visit a doctor. – Тебе следует посетить доктора.I **have to** work. – Мне приходится работать. They **are to** go. – Им нужно идти.

9. *Gerund* – Герундий

Герундий – это неличная форма глагола, которая образуется от инфинитива без частицы to.

Герундий употребляется:

• В начале предложения (как подлежащее):

The **solving** of this problem is a very difficult problem – Решение этой проблемы – очень трудная задача.

Признаком герундия – подлежащего является отсутствие другого подлежащего в предложении

• После предлогов, за которыми следует указание на процесс действия.

I am fond **of reading** – Я люблю читать.

Герундий с предлогами **by** или **without**, как правило, переводится деепричастиями :

He translated the text **without using** a dictionary. – Он перевел текст, не пользуясь словарем.

• После глаголов, указывающих на начало, продолжение или конец действия:

He began **working** at the problem two months ago. – Он начал работать над этой проблемой два месяца назад.

• С притяжательным местоимением, которое употребляется перед герундием в качестве определения.

The students **working** on a collective farm in summer helps them study many agricultural processes. − То, что студенты работают летом в колхозе, помогает им изучать многие сельскохозяйственные процессы.

Герундий имеет следующие формы:

	Active	**Passive**
Simple	translating	being translated
Perfect	having translated	having been translated

10. Infinitive – Инфинитив

Признаком инфинитива является наличие частицы ***to*** перед глаголом: ***to*** work - работать, ***to*** like – любить.

Формы инфинитива

Группа времен	Действительный глагол / **Active**	Страдательный залог / **Passive**
Simple	to do−делать	to be done – быть сделанным
Continuous	to be doing − делая	-
Perfect	to have done − (уже) сделать	to have been done − (уже) быть сделанным

Инфинитив в функции подлежащего и обстоятельства цели

Для распознавания в предложении инфинитива-подлежащего и инфинитива-обстоятельства цели, стоящего на первом месте, следует найти в таком предложении подлежащее (слева от сказуемого). Если подлежащее имеется, то инфинитив является обстоятельством цели, если нет, то инфинитив является подлежащим:

To provide big cities with dairy products is very important. − Обеспечить большие города молочными продуктами очень важно. (инфинитив-подлежащее).

To provide big cities with dairy products collective farmers must have good fodder for cows. − Чтобы обеспечить большие города молочными продуктами, колхозники должны иметь хороший корм для коров (подлежащее здесь collective farmers – существительное).

11. *Zero Conditional* - Условные предложения нулевого типа

Условные предложения нулевого типа в английском языке используются, когда описываются события, явления, которые всегда истинны, реальны (например, общеизвестные истины, научные факты и т.п.)

Например: If you heat ice, it melts. – Если нагревать лёд, то он тает.

В условных предложениях нулевого типа ***if*** может заменяться союзом ***when*:**

When he comes to town, we have dinner together. − Когда он приезжает в город, мы вместе ужинаем.

Способ образования:

If…Simple Present..., … Simple Present.

If he tells funny jokes, I laugh. – Если он рассказывает смешные истории, я смеюсь.

Appendix 2.Writing a CV (a Resume)

If you are looking for a job, then it is very important that you understand how to offer yourself in the best way to an employer. This is done by writing a "CV" (curriculum vitae – Latin for "life story"), called in some countries a "resume".

The purpose of your CV is to make you attractive, interesting, worth considering to the company and so receive a job interview. All resumes cover certain standard items: name, address, phone number; education; past experience; skills and talents; publications, awards, honors, membership in professional organizations; and a list of references or a statement that they are "available upon request". A sample Resume (with variants) is quoted below. Complete the forms for yourselves.

Curriculum Vitae (Resume)

Name (first, middle, last):

Contact Information: address, phone, fax, E-mail

General Skills: e.g. foreign language skills (slight, fair, fluent), computer literacy, communicational competence, organizational (managerial) skills, etc.

Special Skills: e.g. welding, machinery maintenance, tractor and combine driving, public speaking, project writing, etc.

Education [from … - till …, type of educational institution, qualifications (specialties) obtained]: Secondary school, Technical school, Vocational training, University (Institute, Academy), Post-graduate (Ph.D. and Master's Degree) courses, etc.
e.g. 2000 - 2005 - Moscow State Agro-Engineering University
Qualification: Mechanical Engineer (Specialty: Technical Maintenance of Agricultural Machinery)

Experience (Positions and Major Responsibilities): e.g. your previous jobs (with dates and a very brief job description) and past agricultural experiences (dairy, beef, swine, poultry, arable crops), orchards, greenhouse operations, vegetable production, etc.).

Personal Features: e.g. team player, academic, task-active, analytically-minded, industrious, flexible, loyal, work-load tolerant, easy-to-learn, target-oriented, people-attentive, energetic, honest, well-organized, like to learn everything new, etc.

Interests and Hobbies: e.g. reading, foot-ball, tennis, country camping, mountain climbing, hunting, biking, surfing, sculpture, traveling, etc.

Personal Data: age; marital status (single, married); number of children.

Targeted Positions: e.g. workshop assistant, mechanical engineer, technical maintenance

specialist, service manager, project supervisor, machinery designer, test expert, or similar positions related to farm machinery use and maintenance.

Salary History and Expectations: e.g. previously - $500.00 plus social package; expected - $700.00 added with a company car and health insurance (other fringe benefits are a plus)

Additional Information: e.g. skilled in working with foreign machinery and equipment, can travel on business two week a month, have a vast experience in communication with western companies and foreign colleagues, have international driver's license (valid through …, permanent), have a private car, etc.
Note: Also, use additional page(s) if necessary to explain your agricultural or other professional background.

Current Employer (Referees): (who could provide Letters of Reference for you).

This is part of a report that a personnel manager wrote after interviewing a candidate for the position of Director of Software Development. Put the verbs in brackets into the present simple or present continuous tense.

Articulate and well presented, Paul Sutherland is an excellent candidate for the post of Director of Software Development. He _____ (want) to leave his present employer, a small computer company, because he _____ (feel) that he _____ (not use) his knowledge of software engineering to the full. He _____ (look for) a more challenging position where his field of specialization can be exploited in a more stimulating environment. He _____ (realize) that our company _____ (grow) rapidly, and that he would be expected to contribute to that growth. He is familiar with our existing range of software and regularly _____ (read) our publications. Although at present he _____ (live) in the south, he _____ (say) that he is willing to go wherever we _____ (decide) to send him. He occasionally _____ (travel) to various European countries for trade fairs and exhibitions and _____ (enjoy) meeting people of different nationalities. At the moment he _____ (attend) a training course at the Goethe Institute in order to perfect his German.

Appendix 3. Методические указания к контрольной работе по дисциплине «Профессиональный иностранный язык»

Методические указания составлены в соответствии с программой дисциплины «Профессиональный иностранный язык» по направлению подготовки 35.04.06 «Агроинженерия» и предназначены для магистров.

Цель указаний – помочь студентам самостоятельно выполнить и оформить контрольные работы по дисциплине «Профессиональный иностранный язык». В методических указаниях приведены общие требования к оформлению и содержанию контрольных работ, рекомендации по их выполнению.

Общие требования к написанию контрольных работ

Контрольные работы выполняются письменно в отдельной тетради в клетку. На обложке тетради необходимо указать фамилию, имя, отчество, шифр специальности, курс, номер группы.

Контрольные работы должны выполняться темными чернилами, аккуратно, четким почерком, следует писать через строку. При выполнении контрольной работы желательно оставлять в тетради широкие поля с левой стороны для замечаний, объяснений и методических указаний преподавателя-рецензента. Задания контрольной работы должны быть выполнены письменно в той последовательности, в которой они даны в настоящих указаниях.

Студент, не сдавший контрольную работу, не допускается к зачету по дисциплине. Контрольная работа, выполненная не в соответствии с указаниями или не полностью, возвращается студенту без проверки.

Контрольная работа оценивается пометкой «зачтено» или «не зачтено». Необходимо помнить о том, что во время зачета производится проверка усвоения материала, вошедшего в контрольную работу.

Рекомендации по организации работы над контрольными заданиями

Контрольная работа является формой контроля и предназначена для определения уровня сформированности грамматических знаний, навыков и умений, обучаемых в результате выполнения письменных заданий. Овладение

грамматическими формами и структурами языка имеет первостепенное практическое значение при его изучении, так как именно с их помощью обеспечивается формирование умений устного и письменного общения в основных видах речевой деятельности: говорении, аудировании, чтении, письме и переводе.

Для правильного выполнения контрольной работы необходимо усвоить следующие грамматические темы:

1. Неопределенные местоимения и их производные: some, any, no, every (+body, +thing, +where, +one)
2. Степени сравнения прилагательных и наречий
3. Модальные глаголы и их эквиваленты
4. Видовременные формы глагола в действительном залоге: простые (Simple), продолженные (Continuous), совершенные (Perfect)
5. Страдательный залог. Особенности перевода на русский язык
6. Инфинитив
7. Причастие
8. Герундий
9. Предлоги

Appendix 4. Контрольная работа

Text 1. Ploughs and ploughing

For centuries men have realized that to grow good crops successively on the same area of land it is necessary to cultivate the soil between each crop.

The earliest cultivations were done with a pointed piece of wood, drawn by men or oxen.

It is from these primitive beginnings that the modern plough and techniques of ploughing have developed.

Ploughing is the first and possibly the most important cultivation in the process of creating a seedbed, for the extent sad effectiveness of subsequent cultivation is often dependent on the quality of the initial ploughing.

When ploughing a field, the aims to achieve are:

1. To loosen the surface layers of the soil, and so allow a free movement of air and water and stimulate bacterial activity. This creates a medium in which the crop roots are able to thrive.

2. To invert the topsoil completely, to bring a fresh layer to the surface for weathering. It is important to avoid going too deep and exposing sterile subsoil.

This complete inversion is also very effective in controlling annual weeds, for these will only geminate when near the surface and many rot when buried more than a few inches. With the rainfall, which exceeds evaporation and transpiration during the winter months, some of those plant foods and very fine soil particles that tend to be washed down through the coil, are also brought back to the surface.

3. To leave as level a surface as possible, to facilitate the movement and work of subsequent machines.

The modern plough is mounted directly behind the tractor, attached to the three - point linkage, being raised and lowered hydraulically.

The function of each part of the plough must be understood, so that adjustments can be made accurately.

The typical mounted plough consists of a frame, which is attached to the tractor. The main components in contact with the soil are the coulter, the share, the moldboard and the landside.

The coulter is carried by the frame of the plough. The share, moldboard and landside are all bolted to the frog, which in turn is bolted to the leg of the plough.

The plough leg is carried by the frame. The share is a triangular piece of steel or cast iron. Its job is to penetrate and then undercut through the soil at the desired depth.

The function of the coulter is to make a vertical cut and divide the soil being raised by the share from the unploughed land. The combination of the share and the coulter creates furrow. The coulter consists of a disc mounted above the share which cuts through the surface vegetation and the soil as it revolves. The moldboard is the part of the plough which turns the furrow over and consists of a long, curved piece of hard-wearing steel. The leading edge may be replaceable and is known as the shin. As the plough turns a furrow, there is a force in the opposite direction which is resisted by the landside of the plough. This is a long piece of metal fitted on the side of the plough against the unploughed land which presses against the furrow wall.

I. Выпишите из текста № 1 предложения с глаголами в Present Simple 3 л. ед. ч. Переведите предложения на русский язык.

II. Выпишите из текста № 1 предложения с модальными глаголами. Подчеркните модальные глаголы. Переведите предложения на русский язык.

III.a) Выпишите из текста № 1 предложение с неопределенным местоимением some, переведите его.

b) В следующих предложениях заполните пропуски неопределенными местоимениями или их производными: **some**, **any**, **no**, **every** (+**body**, +**thing**, +**where**, +**one**).

1. I wanted you to tell us … about the results of the tests, as the engineer has not let us know … about them yet.
2. … phoned you when you were out, but I could find you ….
3. I don't know … about the remaining goods, as the sellers have not sent us their answers yet.
4. - Has … made arrangement about our visit to the exhibition?
   - I am sorry … has informed me about it yet.

5. We will go … tonight, as the weather is bad. I think … will be glad to stay at home and to watch TV.

IV.a) Выпишите из текста № 1 и переведите предложения, в которых глагол-сказуемое стоит в Present Perfect.

b) Заполните следующие предложения глаголами из списка в правильной форме настоящего времени, подчеркните их.

assist	*look up*
attend	*make*
call back	*pick up*
deserve	*print out*
get through	*put through*

1. Normally she _____ straight away. 2. His secretary always _____ the phone first. 3. This year we _____ to get a pay rise. 4. This week he _____ the Personnel Director with the interviews. 5. She _____ the number in the phone book at the moment. 6. Today I _____ a training session on quality control. 7. Once a week the computer _____ the sales figures. 8. We hardly ever _____ to Bombay so easily. 9. Please hold on. I _____ to the Sales Department. 10. I _____ some notes now and I'll make the call in a few minutes.

c) В диалоге поставьте глаголы в скобках в нужную форму, подчеркните их.

A: Hello, (to be) that John Deere Co.? I'd like (to speak) to Joshua Brames, please.

B: Yes, Brames (to speak).

A: Good afternoon, Mr. Brames. This (to be) Thomas Alfredson of Case. We (to see) your new models of 130 horsepower tractors, and we (to be) interested in (to buy) them. (Can) you (to send) us your offer?

B: Oh, you (to know) Thomas, I (to believe) we (to send) you our offer already. You (to receive) it?

A: Not yet. When you (to send) it?

B: I (to mail) it a week ago.

A: Then we (must) receive it today or one of these days.

B: I (to think) so. How many tractor units would you like to buy?

A: Between six and a dozen.

B: Good. And when you (to require) them?

A: In April or in May this year would be perfect.

B: I (to trust) we (can) ship you the machines early in April.

A: When I (to receive) your offer, I surely (want) to clear up some points. When we (to meet)?

B: I (to be) glad to see you any time on Friday.

A: You (to think) the contract (be) ready by that time?

B: I (to hope) that, for I (to leave) for Leeds, Britain, on the 15th of June.

A: I (to guess) that is next Sunday. You (to join) me for dinner on Saturday?

B: Yes, with my pleasure. I (to call) you at the hotel at about six then.

A: Thank you. See you then, Joshua.

B: Good-bye, Thomas.

V. Выпишите из текста № 1 и переведите предложения, сказуемые которых употреблены в страдательном залоге. Подчеркните сказуемые.

VI. Выпишите из текста № 1 и переведите пять предложений, в которых есть инфинитив. Подчеркните инфинитивы.

VII. Выпишите из текста № 1 и переведите предложения, в которых есть герундий и причастие I. Уметь объяснить разницу.

VIII. Письменно переведите текст № 2 на русский язык, обращая внимание на -ing формы.

Text 2. Robotics in Agriculture: Types and Applications

Agriculture is quickly becoming an exciting high-tech industry, drawing new professionals, new companies and new investors. The technology is developing rapidly, not only advancing the production capabilities of farmers but also advancing robotics and automation technology as we know it.

At the heart of this phenomenon is the need for significantly increased production yields. The UN estimates the world population will rise from 7.3 billion today to 9.7 billion in

2050. The world will need a lot more food, and farmers will face serious pressure to keep up with demand.

Agricultural robots are increasing production yields for farmers in various ways. From drones to autonomous tractors to robotic arms, the technology is being deployed in creative and innovative applications.

Agricultural robots automate slow, repetitive and dull tasks for farmers, allowing them to focus more on improving overall production yields. Some of the most common robots in agriculture are used for harvesting and picking; weed control; autonomous mowing, pruning, seeding, spraying and thinning; phenotyping; sorting and packing; utility platforms.

Harvesting and picking is one of the most popular robotic applications in agriculture due to the accuracy and speed that robots can achieve to improve the size of yields and reduce waste from crops being left in the field. These applications can be difficult to automate, however. For example, a robotic system designed to pick sweet peppers encounters many obstacles. Vision systems have to determine the location and ripeness of the pepper in harsh conditions, including the presence of dust, varying light intensity, temperature swings and movement created by the wind. But it still takes more than advanced vision systems to pick a pepper. A robotic arm has to navigate environments with just as many obstacles to delicately grasp and place a pepper. This process is very different from picking and placing a metal part on an assembly line. The agricultural robotic arm must be flexible in a dynamic environment and accurate enough not to damage the peppers as they are being picked.

Harvesting and picking robots are becoming very popular among farmers, but there are dozens of other innovative ways the agricultural industry is deploying robotic automation to improve their production yields.

The demand for food is outpacing available farmland and it is up to farmers to close this gap. Agricultural robots are helping them do just that.

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