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Московской области
«Авиационный техникум имени В.А. Казакова»

УТВЕРЖДАЮ
Зам. директора по УМР
М.В. Иванова
«23» марта 2018 г.



Цикловая комиссия общеобразовательных и
естественнонаучных дисциплин

УЧЕБНО – ПРАКТИЧЕСКОЕ ПОСОБИЕ
Сборник текстов для чтения по авиационной тематике

по дисциплине «Иностранный язык»
для студентов 2-4 курсов
специальностей 24.02.01 Производство летательных аппаратов
25.02.06 Производство и обслуживание авиационной техники

РАССМОТРЕНО
на заседании предметно-цикловой комиссии
общеобразовательных и естественнонаучных
дисциплин

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Протокол н 11

от «23» марта 2018 года
Председатель ЦКК:

И

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Учебное пособие по английскому языку предназначено для студентов 2-4 курса специальностей 24.02.01 Производство летательных аппаратов и 25.02.06 Производство и обслуживание авиационной техники.

Данное пособие составлено в соответствии с Федеральным государственным образовательным стандартом и программой по иностранному языку по техническим специальностям для учреждений среднего специального образования.

Целью пособия является подготовка студентов к использованию иностранного языка в их будущей профессиональной деятельности, т.е. обучение как письменной, так и устной формам. Кроме того, полученные навыки и умения могут служить базой для дальнейшего самообразования.

Совокупность текстов, составляющих каждый раздел, предусматривает развитие навыков по основным видам чтения. Тексты сопровождаются системой упражнений, направленных на усвоение специальной лексики и терминологии, развитие умения анализировать и обобщать информацию.

В каждом разделе предусматривается повторение наиболее значимых грамматических явлений. С этой целью раздел содержит обширную систему практических упражнений.

Предлагаемый ряд разнообразных дискуссионных видов деятельности, творческих заданий предоставляет студентам возможность совершенствовать навыки устной и письменной речи, повысить уровень речевой компетентности.

Материал пособия охватывает следующую тематику: история развития авиации, воздушный транспорт, классификация самолетов, аэропорт, управление воздушным движением, безопасность, исследование космоса и роль русских ученых в освоении космоса.

Учебное пособие может использоваться для аудиторной и самостоятельной работы студентов.

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1. ENGLISH AS A WORLD LANGUAGE AND AN INTERNATIONAL AVIATION LANGUAGE

MIND PRONUNCIATION:

psy - [saɪ]	phy -[f]	ng [ŋg]	- tion [ʃn]	qu [kw]	x cc	[ks]
psychology psychologist psychological psychoanalysis psychoanalytic psychophysics psychotherapy psychotic psycic	physiology physical spheres phraseology	language tongue	aviation immigration organization population potential sections situations, special sufficient proficiency especially	frequently require requiring requirements	flexibility accident occur occurred	

CULTURAL NOTES:

ICAO /aɪ'keɪoʊ/ **International Civil Aviation Organization** - ИКАО, Международная организация гражданской авиации - *a specialized agency of the United Nations. It codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth. Its headquarters are located in the Quartier [ˈkɑːtɪə] International of Montreal [ˌmɒntrɪ'ɔːl], Quebec [k(w)'ɪbɛk], Canada.*

ICAO Annex 1 - Приложение 1 к Конвенции ИКАО о международной гражданской авиации

Tenerife [ˌtɛn(ə)'rɪːf], **Canary Islands** - is the largest and most populated island of the seven Canary Islands. It is also the most populated island of Spain, with a land area of 2,034.38 square kilometres (785 sq mi) and 898,680 inhabitants, 43 percent of the total population of the Canary Islands. Tenerife is the largest and most populous island of Macaronesia [ˌmɑːkəɹə(ʊ)'niːziə] Макаронéзия.

Pan American World Airways known from its founding until 1950 as Pan American Airways and commonly known as Pan Am, was the principal and largest international air carrier in the United States from 1927 until its collapse on December 4, 1991.

KLM - «Королевская авиационная компания» - is the flag carrier airline of the Netherlands.

PELA (Proficiency in English Language) - профессиональный уровень владения английским языком

Language and Publications Branch - отдел переводов и публикаций

ATC (*Air Traffic Control*) - управление воздушным движением

Boeing is an American multinational corporation that designs, manufactures, and sells airplanes, rotorcraft, rockets, and satellites worldwide. Boeing is among the largest global aircraft manufacturers.

Boeing William Edward (1881 - 1956), U.S. industrialist. In 1927, he founded United Aircraft and Transport, which, in 1934, was divided into Boeing Aircraft, United Aircraft, and United Airlines.

Study vocabulary:

active runway – действующая,
рабочая ВПП

amendments - поправка (к
резолуции, законопроекту)

annex - приложение, дополнение (к
тексту, договору, книге)

collide at - сталкиваться, приходить
в противоречие; конфликтовать

concern over - озабоченность по
поводу

disaster - беда, бедствие, несчастье

emergency situations -
чрезвычайное положение

engineering sciences – технические
науки

establishment - создание,
образование, учреждение

extend requirements – расширять
требования

flexibility - гибкость

growth of population - (при)рост
населения

heavy loss of lives – огромные
человеческие потери

incident - случай, случайность;
происшествие, событие, эпизод

initiate - начать, приступать,
положить начало

insufficient English language

proficiency - плохая языковая
подготовка

intensive efforts - напряженные
усилия

make clear – прояснять

massive immigration - массовая
иммиграция

meteorology [ˌmi:t(ə)'rɒlədʒi] -
метеорология

miss - не заметить; не услышать

misunderstand (misunderstood) -
неправильно понять

occur (occurred) - происходить,
случаться, совершаться

openness - открытость

opposite direction -

противоположное направление

plain language - разговорный язык;
упрощенный язык;

play a contributory role – играть
значительную роль

present standing - настоящее
положение (вес)

psychology [saɪ'kɒlədʒi] -
психология

require - требовать

results in - кончатся (чем-л.) ,

иметь результатом, привести к ч-л

settlement - колония, поселение

simplicity of forms (very few endings) – простота форм
spread language –
распространенный язык
sufficient - достаточный;
обоснованный

taxi instructions - указание по выполнению рулёжки
turn off – зд. вырулить
urgent problem - актуальная проблема

English has become a world language because of its **establishment** as a mother tongue outside England, almost in all the continents of the world. This exporting of English began in the XVIIth century, with the first **settlements** in North America. Above all, the great growth of population in the United States together with **massive immigration** in the nineteenth and twentieth centuries has given the English language its **present standing** in the world. Nowadays it is the most spread language on Earth. These characteristics are: **simplicity** of forms (very few endings); **flexibility** (the same word can operate as some different parts of speech); **openness of vocabulary** (English words are frequently admitted by other languages). At present English is the language of business, technology, sport and aviation.

There are four working languages in ICAO– English, French, Spanish and Russian. But all meetings, conferences and assemblies are conducted in English and then all materials are translated into other languages. For this purpose ICAO has a special “Language and Publications Branch” with four sections.

The most **urgent** problem in aviation is safety. The progress in safety is achieved by **intensive efforts** in **various spheres** – **engineering sciences, meteorology, psychology**, medicine, economics and “last but not least” the English language. **Insufficient English language proficiency often results in accidents and incidents.** For example, the worst **disaster** in aviation history **occurred** in 1977 when two Boeings 747 **collided at** Tenerife [ˌten(ə)ˈriːf], Canary Islands. The crew of Pan American 747 **missed or misunderstood taxi instructions requiring a turn off the active runway.** At the same time KLM 747 initiated a **take off** on the opposite direction. The two aircraft met on the **active runway, with heavy loss of lives.**

Between 1976-2000 more than 1100 passengers and crews lost their lives in accidents in which language **played a contributory role.**

Concern over the role of language in airline accidents brought real actions. So in March 2003 ICAO adopted **Amendments to ICAO Annexes 1, 6, 10 and**

11. These Amendments **make clear** and **extend language requirements**. In addition, they contain new more strict requirements for language testing.

Additional standards in **Annex 10** demand to follow more closely to standard phraseology in all air-ground exchanges and to use plain language when phraseology is not sufficient. Phraseology alone is unable to cover all of the potential situations, particularly (especially) in critical or **emergency situations**. Therefore the PELA (Proficiency in English Language) test examines use of both ATC phraseology and **plain English**.

EXERCISES

1. Ответьте на вопросы:

1. When did the exporting of English begin?
2. In what spheres of life is English most widely used?
3. How many working languages are there in ICAO?
4. In what language are meetings, conferences and assemblies conducted in ICAO?
5. How is the progress in safety achieved?
6. Could you explain why English language is so important in solving safety problem?
7. What are ICAO real actions for improving English language proficiency?
8. Will you describe the Amendments to ICAO Annexes adopted in 2003?
9. What do additional standards demand?
10. Can phraseology alone cover all of the potential situation in the air?
11. What are the PELA test requirements now?

2. Переведите слова, обращая внимание на словообразующие элементы:

achieve – achievement –
achievable
act – active – actively – activate –
activity – action
add – addition – additional –
additionally
collide – collision
contribute – contributory –
contribution
cover – coverage – discover –
discovery

critical – uncritical – critically –
criticize – criticism
establish – establishment
heavy – heavily – heaviness
lose – loser – loss
oppose – opposite – opposition –
opponent
real – really – realist – realistic –
realism – reality
require – requirement –
unrequired
safe – unsafe – safely – safety

special – specially – specialist –
speciality – specialize –
specialization
strict – strictly – strictness
sufficient – sufficiently –
sufficiency

urgent – urgency
vary – various – variously –
variety – variant – variable –
variability

3. Найдите в тексте английские эквиваленты следующих слов и словосочетаний:

первые поселения, расширять требования, большой рост населения, играть значительную роль, вместе с массовой иммиграцией, нынешнее положение в мире, самый распространенный язык на Земле, простота форм, гибкость, открытость, актуальная проблема, напряженные усилия, различные сферы, технические науки, плохая языковая подготовка, кончатся (чем-л.), язык бизнеса, безопасность полетов, метеорология, психология, медицина, экономика, приводить к авариям и несчастным случаям, отключать активные взлетно-посадочной полосы, огромные человеческие потери, ИКАО приняла поправки, дополнительные стандарты, неправильно понять, указание по выполнению рулёжки, требовать, действующая ВПП

4. Переведите на английский язык:

1. Каково население этого района?
2. Когда появились первые поселения европейцев на этом континенте?
3. Каковы основные характеристики английского языка?
4. Они обсуждают вопрос о новых рабочих языках в ИКАО – арабском и китайском.
5. Когда проводилась последняя ассамблея ИКАО?
6. Кто переводил эти материалы на русский язык?
7. Какова цель этой встречи?
8. Есть какие-нибудь новые публикации по этой проблеме?
9. Они достигли большого успеха в этой области.
10. Большие усилия нужны для решения этой проблемы.
11. Необходимо хорошо владеть английским, чтобы работать в международном аэропорту.
12. Недостаточное владение экипажем английским языком привело к катастрофе.
13. Катастрофа произошла над океаном.
14. На какой высоте столкнулись самолеты?
15. В этой катастрофе была большая потеря жизней.

16. ИКАО примет новые поправки к Приложению 1 в следующем месяце.
17. У нас достаточно топлива, чтобы лететь в Копенгаген.
18. Мы должны владеть как радиотелефонной фразеологией, так и обычным английским.

5. Выберите слово, противоположное по значению.

Term	Antonym
1. empty	a) proper, b) full, c) dry, d) total
2. shallow	a) flat, b) huge, c) similar, d) deep
3. easy	a) above, b) difficult, c) main, d) successful
4. to destroy	a) to arouse, b) to cut, c) to build, d) to heat
5. huge	a) small, b) main, c) concrete, d) numerous
6. complicated	a) advanced, b) expensive, c) permanent, d) simple
7. to assemble	a) to cover, b) to part, c) to extend, d) to manufacture
8. strength	a) weakness, b) crowd, c) hole, d) brick
9. always	a) proper, b) full, c) dry, d) total
10. to damage	a) flat, b) huge, c) similar, d) deep

6. Quickly read the newspaper report *Bad Language on the Airways May Be Fatal* and find out:

- the situation
- the kind of mistake that is made
- a possible result

Answer the question: When do you think it could be dangerous to speak bad English?

The words to understand the texts:

according to - в соответствии с,
соответственно, согласно
advertising - реклама,
рекламирование
air traffic controllers - диспетчеры
УВД

abolition of all anglicisms - отмена
всех англицизмов
claims are made - предъявляются
претензии
communicate in a crisis – общаться в
критических ситуациях

electronic retrieval systems -
электронные поисковые системы
estimate - оценивать, оценить
inadequately trained - недостаточно
подготовлены
infiltration – проникновение
international shipping -
международное судоходство,
международные грузоперевозки
invasion - проникновение
'jumbo jet' - 'Аэробус'
language pollution - загрязнение
языка
language sandwich –
многослойность языка

poor standards of radio English -
плохие стандарты
радиопереговоров на английском
языке
resort to their own language in a
crisis - прибегать к своему родному
языку в критических ситуациях
stray from the standard phrases into
idiom - отклоняться от
стандартных фраз в идиомах
team of experts - группа экспертов
to be regarded with horror - с ужасом
смотреть
to eradicate - искоренять

Bad Language on the Airways May Be Fatal

AIR travellers are at risk because of **poor standards of radio English**, according to a team of experts in three countries. Some pilots and **air traffic controllers are inadequately trained** and many cannot **communicate in a crisis**.

The claims are made by language and aviation specialists in Britain, France and Australia. A team, organised so from Cambridge University, says that although English is accepted as the international language of the air, people are failing seriously when it comes to using it:

- There are wide variations in the ability of controllers and pilots who do not have English as their first language.
- Conversations **stray from the standard phrases** (drawn up by the International Civil Aviation Organisation) into idiom and inexact, everyday use of English. This has been a factor in numerous aircraft accidents.
- Controllers and flight crews, because they know only the routine phrases, resort to their own language in a crisis.

Have you ever been in a situation where someone made a dangerous, embarrassing or amusing language mistake?

7. **Quickly read the next two texts. Choose the most appropriate title for each one:**

- a. Learning English
- b. Working with English
- c. A World Language

- d. **Language Sandwich**
- e. **Language Pollution**

Two views of the English language

Text A

ENGLISH is losing its political and cultural associations and becoming the property of all cultures. Over 70 countries in the world use English as the official or semi-official language, and in 20 more English occupies an important position. It is the main foreign language taught within most school systems. Worldwide, many newspapers are published in English and it is the language of much radio and television broadcasting. English is the language, of international business, the main language of airports, air traffic control and international shipping. It is the language of science, technology and medicine, and it is estimated that two-thirds of all scientific papers today are first published in English. It is the language of diplomacy and sport; it is one of the working languages of the United Nations and the language used by the International Olympic Committee. International pop culture and advertising are also dominated by English. 70% of the world's mail is written in English, and 80% of all information in electronic retrieval systems is stored in English.

Text B

ENGLISH infiltration of foreign languages **is often regarded with horror**. The late President Pompidou [pɔ̃pidu]; of France recommended a return to totally unpolluted French with an **abolition of all anglicisms**. In official documents 'fast food' and 'jumbo jet' were to be referred to by French expressions instead. But it would be difficult to **eradicate** the use of such familiar 'French' terms as 'le weekend', 'le sandwich', or 'le parking'. French is not the only 'polluted' language. In German we find 'der Babysitter', 'der Bestseller' and 'der Teenager'.

'Il weekend' turns up again in Italian, where we can also find 'la pop art' and 'il popcorn'. 'Jeans' is found in both Italian and Spanish, and in Spanish we also have 'pancakes', and 'sueter' (sweater). Russian young people like to wear the

latest trainer-style 'shoozy', while Japanese young people like to eat 'eisucurimu' (ice cream). But this **invasion** is not one-sided. Other languages have quietly been getting their own back for a long time. Native English speakers may think they are speaking 'pure' English when they talk about the alphabet, the traffic, a mosquito, a sofa, a garage, their pyjamas or their boss, but Greek, Italian, Spanish, Arabic, French, Hindi and Dutch speakers know better!

EXERCISES

1. Обсудите вопросы:

1. In what fields is English used in your country?
2. How often do you come across English in your daily life?
3. Can you think of any examples of:
 - English words which have become part of your language?
 - words from your language which have become part of English?

2. Find the answers to these questions in Text A. Choose the correct answer from the list A-E.

1. How many countries use English as the official or semi-official language?	a. two-thirds
2. In how many countries is English important?	b. 70%
3. How many of all scientific papers are first published in English?	c. over 70
4. How much of the world's mail is in English?	d. 80%
5. How much of all information stored in electronic retrieval systems is in English?	e. over 90

2. FROM THE HISTORY OF AVIATION

MIND PRONUNCIATION:

aircraft	aircraft	[ʃ]
ambulance ['æmbjələn(t)s]	hypersonic [ˌhaɪpə'sɒnɪk]	charter
amphibian [æm'fɪbiən]	lighter-than-air	[k]
bomber ['bɒmə]	long-range	characteristics
cargo ['kɑ:gəʊ]	low-speed	ichnology
civil ['sɪv(ə)l]	medium-range military	architecture
combat ['kɒmbæt]	multi-purpose	technology

enemy ['enɪmɪ] friendly general-purpose heavier-than-air high-altitude ['æltɪtjuːd] high-speed	passenger cargo research [rɪ'sɜːtʃ] short-haul ['ʃɔːthɔːl] short-range subsonic [sʌb'sɒnɪk] transoceanic [ˌtrænzəʊfɪ'ænɪk]	Ш machine [mə'ʃiːn] parachute ['pærəʃuːt]
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CULTURAL NOTES:

Leonardo da Vinci [lɪə,nɑːdəʊ də 'vɪntʃi] was an Italian Renaissance polymath (erudite ['erudət] - эрудит; учёный) whose areas of interest included invention, painting, sculpting, architecture, science, music, mathematics, engineering, literature, anatomy, geology, astronomy, botany, writing, history, and cartography. He has been variously called the father of palaeontology, ichnology *наука, изучающая отпечатки ступней вымерших животных; ихнология*, and architecture, and is widely considered one of the greatest painters of all time. He is also credited with the inventions of the parachute, helicopter and tank.

The Montgolfier [mɒn'gɒlfɪə] brothers - Joseph Michel (1740-1810) and Jacques Étienne (1745-99), French inventors and pioneers in hot-air ballooning. In 1782 they built a large balloon from linen and paper and successfully lifted a number of animals; the first human ascents followed in 1783

Alexander Mozhaisky was an admiral in the Imperial Russian Navy, aviation pioneer, researcher and designer of heavier-than-air craft.

Henri Farman (26 May 1874 – 17 July 1958) - was an Anglo-French aviator and aircraft designer and manufacturer with his brother Maurice Farman. His family was British and he took French nationality in 1937.

Лобанов, Николай Родионович (28 ноября 1882, Москва — 1959) — известный авиаконструктор, основатель русской зимней авиации, изобретатель первого снеголёта, директор Московского аэродрома на Ходынском поле. Lobanov invented aeroplane skis.

Igor Ivanovich Sikorsky (May 25, 1889 – October 26, 1972) was a Russian-American aviation pioneer in both helicopters and fixed-wing aircraft. First success came with the S-2, the second aircraft of his design and construction.

After immigrating to the United States in 1919, Sikorsky founded the Sikorsky Aircraft Corporation in 1923, and developed the first of Pan American Airways' ocean-conquering flying boats in the 1930s.

In 1939, Sikorsky designed and flew the Vought-Sikorsky VS-300, the first viable American helicopter, which pioneered the rotor configuration used by most helicopters today. Sikorsky modified the design into the Sikorsky R-4, which became the world's first mass-produced helicopter in 1942.

Константи́н Константи́нович Арцеу́лов (17 (29) мая 1891, Ялта — 18 марта 1980, Москва) — русский и советский лётчик, художник-иллюстратор, внук художника Ивана Константиновича Айвазовского. Konstantin Artseulov was an artist, and also an aerobatics pilot and constructor of sailplanes. During WWI he was a military pilot and an instructor in a flight school where used a tailspin figure for the first time in Russian aviation. Artseulov was also a skillful artist and was trained from early childhood by his famous grandfather the marine painter Ivan Aivazovsky.

Study the vocabulary:

aeronautical engineering -

самолётостроение

aeronautics [ˌɛərəˈnɔːtɪks] -

аэронавтика

aviatrixes [ˈeɪvɪɪtɹɪks] - лётчица;

авиаторша

award - награждать

circular flight - полёт по кругу;

полёт по замкнутому маршруту

corkscrew – штопор

cruising range - дальность полёта

daring - отважный

descend - опускаться, снижаться (о самолёте)

dirigible [ˈdɪrɪdʒəbl̩] - дирижабль

executed the loop – выполнить

петлю

heavy bomber - тяжёлый

бомбардировщик

ice-breaker - ледокол

improved version – улучшенная версия

internal combustion engine -

двигатель внутреннего сгорания

operation - эксплуатация

outstanding - выдающийся

pressurized cabin -

герметизированная кабина

principles of airscrew design –

принципы конструкции винта

rapid development - бурное

развитие

reconnaissance [rɪˈkɒnɪs(ə)n(t)s] -

разведка

set up a world record - установить

мировой рекорд

steam engine - паровой двигатель

weigh - весить

wing theory - теория крыла

FROM THE HISTORY OF AVIATION

1. Aviation is an *operation* of heavier-than-air aircraft and related activities. Aviation can be *conveniently* divided into military aviation, air transport, and general aviation. Military aviation includes all aviation activity by the *armed services, such as combat, reconnaissance, and military air transport*. Air

transport consists mainly of the operation of commercial airlines, which *handle both freight and passengers*. *General aviation* consists of agricultural, business, charter, instructional, and pleasure flying; it includes such activities as the *operation of air taxis*, as well as *aerial surveying* and *mapping*.

Early Interest in Human Flight

2. One of the most famous Greek legends is the legend of Daedalus ['di:dələs] and his son Icarus who made wings and fastened them on with wax. Daedalus landed in safety, Icarus ['ikərəs] was not so careful and he flew closer and closer to the sun. The wax melted, the wings came off and he fell into the sea.
3. The first scientific principles of human flight appeared in the 14-th century. The problem was studied by the great scientist Leonardo da Vinci. He observed the flight of birds, studied the air and its currents and designed a flying machine the wings of which were operated by a man.
4. But the first actual flight which man made was that in the balloon. In October 1783 the Montgolfier brothers in France sent two men almost 25 metres up in a balloon which **descended** 10 minutes later, about 2.5 kilometres away.

The Birth and Development of the Airplane

5. The first Russian aircraft designer was Alexander Mozhaisky. His airplane, a monoplane, with two **light steam engines** was tested on August 1, 1882. With the first Russian pilot, I.N. Golubev the plane rose into the air and flew a distance of 200 metres before it landed.
6. At that time the same work was being conducted by Otto Lilienthal ['li:lɪəntə:l], a remarkable German inventor. In 1891 he made his flight in a glider covering 35 metres. In 1903 two Americans, the brothers Wilbur and Orville Wright, built their aeroplane. It flew only 32 metres but it was the first aeroplane with an **internal combustion engine** that was a big step forward.
7. In the following years aviation made big advances. In 1908 Henry Farman, in France, made a **circular flight** of one kilometre. A year later Bleriot ['bler-ē-ō] crossed the English Channel. In 1913 a Russian student Lobanov invented aeroplane skis and this enabled to land and take off in winter.
8. In 1913 the Russian designer Igor Sikorsky built the world's first multiengined heavy aircraft. That same year the Russian pilot Nesterov **executed the first**

loop. Another Russian pilot, Artseulov, in 1916 proved that a pilot can take his plane out of a **corkscrew**.

9. At the beginning of the 20-th century the **dirigible** was invented. The most known inventor of a dirigible is Count Ferdinand von Zeppelin, a retired German army officer. His famous "Graf Zeppelin" in 1929 began a cruise which took 21 days 8 hours and 26 minutes to circle the world.
10. An outstanding event in the history of aviation took place in Petersburg in 1913. That year a heavy multiengined aeroplane "Russky Vityaz» was constructed. It **weighed** 4,940 kg and had a 1,440 kg useful load. On August 2, 1913 with seven passengers on board it **set up a world record** by remaining in the air for 1 hour 34 minutes. Its top speed was over 90 km/hr.
11. In 1914 an **improved version** of the multiengined **heavy bomber** of the Ilya Murometz type was built. It weighed 3,000 kg and had a 1,760 kg useful load, a maximum **cruising range** of 700 km and a top speed of more than 110 km/hr.

Aircraft Designers, Pilots

12. Among the pioneers of aviation are the names of aircraft designers Tupolev, Polikarpov, Sukhoi, Arkhangelsky, Ilyushin, Yakovlev and others; the pilots Vodopyanov, Doronin, Kamanin, Lyapidevsky and some others - the first Heroes of the Soviet Union who were **awarded** this title for saving the passengers and the crew after **ice-breaker** Chelyuskin had been crashed by ice. In 1937 the world applauded the **daring** non-stop flight by Chkalov and his crew to the USA via the North Pole on the ANT-23. In 1938 Soviet **aviatrixes** Grisodubova, Raskova and Osipenko made a non-stop long-distance flight to the Far East and became the first Heroes of the Soviet Union among women.

Aviation Pioneers

13. And, of course, it is necessary to mention the names of the outstanding Russian scientists who considerably contributed aviation. It is the great Russian scientist M.V.Lomonosov who developed the scientific principles of flight of bodies heavier-than-air and built the first helicopter model in the world.

14. The great Russian scientist D.I. Mendeleev is the author of many **outstanding** researches in aeronautics. He developed the principles of the stratostat design with a **pressurized cabin**.
15. S.A.Chaplygin, the outstanding scientist in mechanics, is one of the founders of the modern aviation theory and the pioneer in aerodynamics of high speeds.
16. Special services in science belong to another famous scientist who is called "father of Russian aviation". It was N.E. Zhukovsky who was the first to develop a scientific **wing theory** and the **principles of airscrew design**. From that time aerodynamics has been a science combining theoretical knowledge with practical experiments. All modern aerodynamical calculations are based on his outstanding theoretical works.
17. N.E. Zhukovsky is the founder of the Central Aero-Hydrodynamic Institute (Z.A.G.I) which became the leading centre of the **aeronautics** and **aeronautical engineering**.
The **rapid development** of aviation began after the World War II. But this is another story.

EXERCISES

1. Ответьте на вопросы:

1. When did the first scientific principles of human flight appear?
2. Who was the first to study the problem of human flight?
3. Describe the flying machine designed by Leonardo da Vinci.
4. What was the first actual flight man made?
5. Why was it impossible to fly in a balloon?
6. Who was the first Russian aeroplane designer?
7. What plane was designed by him?
8. What distance did the plane cover?
9. Who designed the first glider?
10. What is glider?
11. What event took place in Petersburg in 1913?
12. How long did "Russky Vityaz" stay in the air?
13. Who is called "the father of Russian aviation"?

2. Переведите слова, обращая внимание на словообразующие элементы:

construct – constructor –
construction
design – designer
develop – development
fly – flight
improve – improvement

invent – inventor – invention
observe – observer –
observation
safe – safely – safety – unsafe
science – scientist – scientific
weigh – weight - weightless

3. Найдите в тексте английские эквиваленты следующих слов и словосочетаний:

Вооружённые силы, полет человека, поток воздуха, конструктор самолета, конструкция крыла, модель вертолета, мировой рекорд, максимальная скорость, беспосадочный полет, паровой двигатель, лыжи самолета, штопор, гермокабина, теория крыла, ледокол, установить мировой рекорд, авиационная техника, награждать, опускаться, быстрое развитие, смелый, усовершенствованный вариант, аппарат тяжелее воздуха; легко, просто, без труда; военная авиация; воздушный транспорт; авиация общего назначения; малая авиация; вооружённые силы; разведывательный воздушный транспорт; военный воздушный транспорт; воздушно-десантный транспорт; управлять перевозкой грузов и пассажиров; эксплуатация авиатакси; аэросъемка и топографическая съемка; эксплуатация; сельскохозяйственная авиация; бизнес-авиация; чартерная (на договорной основе) авиация; учебная авиация; летать – летал; снижаться; авиаконструктор; набирать высоту; многомоторный; полёт; необходимо отметить; выдающийся; знаменитый; внести значительный вклад в авиацию; прогресс; аэронавтика; теория авиации; аэродинамические расчеты; приземляться; взлетать.

4. Переведите на английский язык:

1. Научные принципы полета человека изучались великим ученым Леонардо де Винчи.
2. Леонардо де Винчи изучал потоки воздуха и создал первую летающую машину.
3. Первый фактический полет был сделан на воздушном шаре в 1783 г.

4. Этот полет длился всего лишь 10 минут, и высота полета была 25 метров.
5. Первым русским конструктором самолета был Александр Можайский.
6. Он сконструировал моноплан с двумя паровыми двигателями в 1882 году.
7. Большим шагом вперед было создание первого самолета с двигателем внутреннего сгорания, сконструированного двумя американцами, братьями Райт.
8. Ученые и конструкторы многих стран работали над созданием и совершенствованием летательных аппаратов.
9. Первый в мире многомоторный самолет был сконструирован русским конструктором Игорем Сикорским.
10. В начале 20го столетия был изобретен дирижабль.
11. В 1913 г. в Петербурге был сконструирован тяжелый многомоторный самолет «Русский витязь».
12. Полет «Русского Витязя» продолжался 1 час 34 минуты, его скорость была 90 км/час.
13. В 1937 году русский летчик Чкалов со своим экипажем совершил беспосадочный полет в США через Северный полюс.
14. Ломоносов построил модель первого вертолета.
15. Менделеев разработал конструкцию стратостата с герметизированной кабиной.

5. Сопоставьте информацию правого столбика с именем в левом столбике.

1. Alexander Mozhaisky	a. pioneers in hot-air ballooning.
2. D.I. Mendeleyev	b. is credited with the inventions of the parachute, helicopter and tank
3. Henri Farman	c. developed the principles of the stratostat design with a pressurized cabin.
4. Lobanov	d. an aerobatics pilot and constructor of sailplanes
5. N.E. Zhukovsky	e. invented aeroplane skis
6. M.V.Lomonosov	f. developed a scientific wing theory and the principles of airscrew design
7. Igor Ivanovich Sikorsky	g. who developed the scientific principles of flight of bodies heavier-than-air and built the

	first helicopter model in the world
8. Artseulov	h. a Russian-American aviation pioneer in both helicopters and fixed-wing aircraft
9. The Montgolfier brothers	i. Anglo-French aviator and aircraft designer
10. Leonardo da Vinci	j. researcher and designer of heavier-than-air craft.
11. Ferdinand von Zeppelin	k. the pioneer in aerodynamics of high speeds
12. Igor Sikorsky	l. inventor of a dirigible
13. S.A. Chaplygin	m. built the world's first multiengined heavy aircraft

6. Прочитайте и переведите предложения, обращая внимание на конструкцию *the (more) ... the (better) (чем.....тем)*.

1. The more English books you read, the sooner you'll master English.
2. The smaller the computer, the faster it can work.
3. The higher we go into the atmosphere, the less is its pressure.
4. The greater the number of free electrons in a substance, the better that substance conducts electricity.
5. The higher the voltage, the higher is the electron velocity.
6. The lower the resistance of the material, the more current can pass through it.
7. The higher the resistance of an insulator, the greater the applied voltage must be.
8. The larger the size of the electrodes, the more current capacity they can supply.
9. The higher the temperature of a body, the faster it will burn.
10. The more weight the object has, the more work we must do to lift it.

3 AIR TRANSPORT

Study the vocabulary:

aeroplane – самолет
balloon – воздушный шар
drawback of air transport – недостаток воздушного транспорта
emergency medical work- неотложная медицинская помощь
heavier than air – тяжелее воздуха

heavy and bulky cargoes – тяжеловесные и крупногабаритные грузы
jet-propelled aircraft – реактивные самолеты
mend – чинить
mist – туман
reliable – надежный

rely (up)on – полагаться на
require – требовать
safety precautions - правила техники
безопасности
supply by air- поставлять по
воздуху
to break down – ломаться
turbo-jet airliners- турбо-
реактивные авиалайнеры

Phrases:

were quickly converted– были быстро переоборудованы

ТОПЛИВО – fuel

for regular airline service- для регулярного обслуживания авиакомпании, авиаперевозчика

AIR TRANSPORT

1. *Modern air transport* using craft which is heavier than air requires a good deal of power merely to stay in the air. It is for this reason that air transport uses more fuel to carry a ton over a distance of a mile than land or water transport. Another drawback of air transport is that whereas a ship, truck or train whose engines break down can stop until they are mended, an aircraft with the same trouble must land. This means that an aircraft must have several engines and this increases its cost. Safety precautions for air transport also tend to make it expensive. It cannot be relied upon for regular services in places or seasons with low clouds and mist. The great advantage of air transport being its high speed, all civilized countries try to develop it. If you want to save time, you will naturally fly by air.
2. *Balloons*. The earliest form of air transport was balloons, which are sometimes called "free balloons" because having no engines they are forced to drift by the wind flow. This fact alone makes balloons not reliable enough for carrying people. If they were safer, they would be used more for transportation, but at present the scientists use balloons mostly for obtaining information about the upper atmosphere, its density, and other scientific subjects. Weather balloons are particularly used by meteorologists.
3. *Aeroplanes*. The heavier-than-air machines called aeroplanes were rather slow in being adopted for transport. The first aeroplane flight was made in 1884. The first aeroplanes were machines that had been used as bombers. They were quickly converted for use by passengers by fitting extra seats and windows. The first regular public air service from London to Paris was started in August.
4. During World War II the value of aeroplanes for carrying heavy loads was recognized. This led after the war to an increase in the practice of sending

goods by air. *Air freight* is expensive but is often thought worthwhile for such goods as early vegetables, fruit and flowers, as well as for things urgently needed such as spare parts for machinery, medical supplies, films and photographs. Some parts of the world are hundreds of miles from a road, railway or waterway, and air transport is the only possible kind of transport. Such places are kept supplied wholly by air.

5. After World War II, bigger and faster airliners were introduced. *Jet-propelled aircraft* were first used in 1950. Air transport is very valuable for emergency medical work. The most important use of air transport besides carrying passengers is carrying mail. If the letters are sent by air mail, they are not long in coming. Although it is unlikely that aircraft will ever replace ships for carrying heavy and bulky cargoes such as oil, coal, minerals, grain and machinery, air transport is already proving a serious rival to passenger ships on some routes.
6. *Helicopters and Hovercraft*¹. Helicopters are very useful in places where there is no room for long, flat runways². Modern turbo-jet airliners need a run of nearly two miles long to take off, but helicopters can use small fields, platforms mounted on ships and the flat tops of buildings. Helicopters were first introduced for regular airline service in 1947. Later, helicopters were used for carrying passengers and mail on short routes, and for taking airline passengers between the centres of cities and the main airports.

Notes to the text

¹*hovercraft* – машина на воздушной подушке

²*runway* – взлетно-посадочная полоса

EXERCISES

1. **Найдите в тексте отрывок, в котором говорится о первом воздушном виде транспорта и переведите его на русский язык.**
2. **Прочитайте отрывок вслух. Найдите и выпишите из текста ключевые слова, относящиеся к воздушным шарам, самолетам и вертолётам.**
3. **Найдите в тексте предложения, в которых употребляется условное наклонение и переведите их на русский язык.**

4. Напишите аннотацию к тексту на русском языке.

5. Переведите на русский язык следующие слова и словосочетания.

Fuel, require ,drawback of air transport, to break down, safety precautions, be relied upon, were quickly converted, to supply by air, Jet-propelled, emergency medical work, heavy and bulk, turbo-jet airliners, for regular airline service, several engines, and this increases its cost, for regular services, low clouds and mist, great advantage of air transport, high speed, to save time, the earliest form of air transport was balloons, makes balloons not reliable enough for carrying people, mostly for obtaining information about the upper atmosphere, were quickly converted, bigger and faster airliners were introduced, carrying mail.

6. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

правила техники безопасности, полагаться на, туман, воздушный шар, надежный, самолет, были переоборудованы, поставлять по воздуху, реактивные самолеты, неотложная медицинская помощь, тяжеловесные грузы, реактивные авиалайнеры, регулярное обслуживание авиакомпании, суда для перевозки тяжеловесных и крупногабаритных грузов, нефть, уголь, полезные ископаемые, зерно, серьезный соперник, пассажирские суда, взлетно-посадочная полоса, взлетать, регулярное обслуживание авиакомпаний

7. Прочитайте текст *THE FIRST BALLOONS* и выполните тест:

THE FIRST BALLOONS

1. Etienne and Joseph Montgolfier lived in the eighteenth century in a little village in France where their father had a paper factory. The two brothers took paper bags from their father, filled them with smoke over a fire and watched them go up into the air.
2. After numerous experiments they were ready to show how their balloon worked. On the day of the flight people from different places came to the little village to see the spectacle. The brothers had constructed a bag some thirty feet in diameter. That big bag was held over a fire. When it was filled

with hot smoke, it went high up into the air. It was in the air for ten minutes and then, as the air bag became cold, the balloon went slowly down.

3. The news about the experiment reached the king who wanted to see it himself. So on September 19, 1783 the Montgolfier brothers repeated their experiment in the presence of the King and Queen of France. This time the balloon carried a cage with a sheep, a cock, and a who were thus the first air travellers. The flight was successful. The balloon came down some distance off with the sheep, the cock and the duck completely unharmed.
4. If the animals could live through this, men could risk too. A month later a balloon was sent up with a Frenchman, Rozier by name. He stayed up in the air for twenty-five minutes at a height of about one hundred feet above the ground, and then came down, saying that he had greatly enjoyed the view (*вид*) of the country.

A month later he and Arlandes made the first free balloon flight. Their friends who came to say good-bye to them were very sad because they thought the flight was very dangerous, but they went up several hundred feet, were carried by the wind over Paris and came down in safety.

Notes:

bag was held over a fire - мешок держался над огнем

go up into the air - подниматься в воздух

hot smoke - горячий дым

paper factory – бумажная фабрика

successful – успешный

unharmed - невредимый

ТЕСТ

1. The Montgolfier brothers lived:
 - a. in England;
 - b. in France;
 - c. in the USA.
2. Their balloon was filled with:
 - a. smoke;
 - b. special gas;
 - c. steam.
3. In the cage fastened to the balloon there were:

- a. some instruments;
 - b. a hen, a dog and a cat;
 - c. a sheep, a cock and a duck.
4. _____ I came to see the experiment.
- a. Very few people
 - b. Some friends from their village
 - c. People from different places
5. Rozier's flight
- a. lasted twenty-five minutes;
 - b. was unsuccessful;
 - c. ended in a disaster.

8. Выпишите из текста глаголы, которые помогут изложить краткое содержание на английском языке.

9. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Бумажная фабрика, подниматься в воздух, горячий дым, успешный, свободный полет на воздушном шаре, овца, петух, утка, невредимый, по имени, прощаться, путешественник, опасный, уносить ветром, огонь, полет на воздушном шаре, достигать, повторить эксперимент.

10. Найдите в правой колонке слова, противоположные по значению словам в левой колонке.

Term	Antonym
1. drawback	a) purpose, b) influence, c) duration, d) advantage
2. low	a) fast, b) high, c) smooth, d) wide
3. capable	a) fit, b) brave, c) incapable, d) due
4. wholly	a) partly, b) nearly, c) no longer, d) steadily
5. to gain	a) to release, b) to lose, c) to take off, d) to send
6. backward	a) available, b) research, c) advanced, d) similar
7. unlikely	a) ordinary, b) possible, c) likely, d) therefore
8. fast	a) slowly, b) usually, c) often, d) enough
9. bulky	a) urgent, b) warm, c) essential, d) small
10. forward	a) across, b) besides, c) ever, d) backward

11. Найдите в правом столбце слово, перевод которого дан в левом столбце.

1. свойство	a) route, b) scale, c) channel, d) feature
2. маршрут	a) route, b) scale, c) channel, d) feature
3. качество	a) reason, b) quality, c) member, d) influence
4. решать	a) to master, b) to turn, c) to solve, d) to obtain
5. соединять	a) to link, b) to clear, c) to care, d) to split
6. средство	a) branch, b) improvement, c) means, d) mean

4. AIRCRAFT SPECIFICATION

Study the vocabulary:

CFR stands for *Code of Federal Regulations* - "Свод федеральных нормативных актов" (Собрание нормативных актов федерального правительства США, официальное издание правительственной документации)

FAA stands for **Federal Aviation Agency** - Федеральное авиационное агентство (США)

pound (lb) - фунт (современная мера веса, используемая в англоговорящих странах; = 453,6 г)

acrobatic – маневренный

empty weight - собственная масса, сухой вес; масса пустого воздушного судна

engine thrust- тяга двигателя

flexible or semirigid wing - крыло не жесткой конструкции

framed pivoting wing - поворотное крыло

in motion- в движении

intake - всасывание

landing gear- шасси

limited – небольшой

nonrotating airfoil(s)- крыло; профиль крыла

occupant – пассажир

operation rules – правила эксплуатации

pitch and roll - тангаж и крен

powered parachute – паралет

powered-lift - воздушное судно вертикального взлёта и посадки

propelled - приводимый в движение

restricted - ограниченного

пользования

rotorcraft - винтокрылый летательный аппарат

self-contained propellants-

одноосновное ракетное топливо

significantly [sig'nɪfɪkəntli] –

значительно

thereto - кроме того, к тому же

unpowered - без механического привода

utility- выгодный, рентабельный

vertical landing - вертикальная посадка

vertical takeoff - вертикальный взлет

weight-shift-control - дельталёт

with respect to – относительно, в отношении, по отношению к, применительно к, в связи с

Aircraft Classifications

The **FAA** uses various ways to classify or group machines operated or flown in the air. The most general grouping uses the term *aircraft*. This term is in **14 CFR 1.1** and means a device that is used or intended to be used for flight in the air.

The FAA differentiates aircraft by their characteristics and physical properties.

Key groupings defined in 14 CFR 1.1 include:

- **Airplane**—an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings.
- **Glider**—a heavier-than-air aircraft, that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine.
- **Lighter-than-air aircraft**—an aircraft that can rise and remain suspended by using contained gas weighing less than the air that is displaced by the gas.
 - **Airship** —an engine-driven lighter-than-air aircraft that can be steered.
 - **Balloon** —a lighter-than-air aircraft that is not engine driven, and that sustains flight through the use of either gas buoyancy or an airborne heater.
- **Powered-lift**—a heavier-than-air aircraft capable of **vertical takeoff, vertical landing(VTOL)**, and low speed flight that depends principally on engine-driven lift devices or **engine thrust** for lift during these flight regimes and on **nonrotating airfoil(s)** for lift during horizontal flight.
- **Powered parachute** —a powered aircraft comprised of a **flexible or semirigid wing**, connected to a fuselage so that the wing is not in position for flight until the aircraft is **in motion**. The fuselage of a powered parachute contains the aircraft engine, a seat for each **occupant** and is attached to the aircraft's **landing gear**.

- **Rocket**—an aircraft propelled by **ejected expanding gases** generated in the engine from **self-contained propellants** and not dependent on the **intake** of outside substances. It includes any part which becomes separated during the operation.
- **Rotorcraft**—a **heavier-than-air aircraft** that depends principally for its support in flight on the lift generated by one or more rotors.
 - **Gyroplane** ['dʒaɪrəpleɪn] —a rotorcraft whose rotors are not engine-driven, except for initial starting, but are made to rotate by action of the air when the rotorcraft is moving; and whose means of propulsion, consisting usually of conventional propellers, is independent of the rotor system.
 - **Helicopter**—a rotorcraft that, for its horizontal motion, depends principally on its engine-driven rotors.
- **Weight-shift-control**—a powered aircraft with a **framed pivoting wing** and a fuselage controllable only in **pitch and roll** by the pilot's ability to change the aircraft's center of gravity with respect to the wing. Flight control of the aircraft depends on the wing's ability to flexibly deform rather than the use of control surfaces.

Size and weight are other methods used in 14 CFR 1.1 to group aircraft:

- **Large aircraft**—an aircraft of more than 12,500 pounds, maximum certificated takeoff weight.
- **Light-sport aircraft (LSA)**—an aircraft, other than a helicopter or powered-lift that, since its original certification, has continued to meet the definition in 14 CFR 1.1. (LSA can include airplanes, airships, balloons, gliders, gyro planes, powered parachutes, and weight-shift-control.)
- **Small Aircraft**—aircraft of 12,500 pounds or less, maximum certificated takeoff weight.

We also use broad classifications of aircraft with respect to the certification of airmen or with respect to the certification of the aircraft themselves.

These definitions are in 14 CFR 1.1:

- Category

1. As used with respect to the certification, ratings, privileges, and limitations of airmen, means a broad classification of aircraft.

Examples include: airplane; rotorcraft; glider; and lighter-than-air;

2. As used with respect to the certification of aircraft, means a grouping of aircraft based upon intended use or operating limitations.

Examples include: transport, normal, utility, acrobatic, limited, and restricted.

- Class

1. As used with respect to the certification, ratings, privileges, and limitations of airmen, means a classification of aircraft within a category having similar operating characteristics.

Examples include: single engine; multiengine; land; water; gyroplane, helicopter, airship, and free balloon;

2. As used with respect to the certification of aircraft, means a broad grouping of aircraft having similar characteristics of propulsion, flight, or landing.

Examples include: airplane, rotorcraft, glider, balloon, landplane, and seaplane.

- Type

1. As used **with respect to** the certification, ratings, privileges, and limitations of airmen, means a specific make and basic model of aircraft, including modifications thereto that do not change its handling or flight characteristics.

Examples include: 737-700, G-IV, and 1900;

2. As used with respect to the certification of aircraft, means those aircraft which are similar in design.

Examples include: 737-700 and 737-700C; G-IV and G-IV-X; and 1900 and 1900C.

This system of definitions allows the FAA to group and regulate aircraft to provide for their safe operation.

EXERCISES

1. Ответьте на вопросы:

1. Does the FAA use various ways to classify or group machines operated or flown in the air?
2. What term does the most general grouping use?
3. What does term *aircraft* mean?
4. What is airplane supported in flight by?
5. What is glider supported in flight by?
6. What aircraft can be steered?

2. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

собственная масса; масса пустого воздушного судна, без механического привода, планер, правила эксплуатации, дирижабль, воздушное судно вертикального взлёта и посадки, вертикальный взлет, вертикальная посадка, тяга двигателя, профиль крыла, паралет, крыло не жесткой конструкции, в движении, пассажир, шасси, приводимый в движение, ракетное топливо, всасывание, винтокрылый летательный аппарат, автожир, дельталёт, поворотное крыло, лётчик, выгодный, рентабельный, маневренный

3. Определите термин по объяснению его значения.

- a. an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings
- b. an aircraft propelled by ejected expanding gases generated in the engine from self-contained propellants and not dependent on the intake of outside substances
- c. an aircraft that can rise and remain suspended by using contained gas weighing less than the air
- d. a heavier-than-air aircraft capable of vertical takeoff, vertical landing
- e. a heavier-than-air aircraft, that is supported in flight by the dynamic reaction of the air against its lifting surfaces
- f. an engine-driven lighter-than-air aircraft that can be steered

- g. a powered aircraft comprised of a flexible or semirigid wing, connected to a fuselage so that the wing is not in position for flight until the aircraft is in motion
- h. it includes any part which becomes separated during the operation
- i. a rotorcraft whose rotors are not engine-driven, except for initial starting, but are made to rotate by action of the air when the rotorcraft is moving
- j. a heavier-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors

3. Переведите на русский язык следующие слова и словосочетания.

An engine-driven fixed-wing aircraft, heavier than air, is supported in flight, glider is supported in flight by the dynamic reaction, lighter-than-air aircraft, can rise and remain suspended by using contained gas can be steered, balloon, is not engine driven, gas buoyancy, an airborne heater, powered-lift vertical takeoff, vertical landing, depend on engine-driven lift devices or engine thrust, powered parachute a flexible or semirigid wing, until the aircraft is in motion, landing gear, an aircraft propelled by ejected expanding gases, self-contained propellants, rotorcraft, the lift generated by one or more rotors, gyroplane, to rotate by action of the air when the rotorcraft is moving; helicopter.

4. Соотнесите слова в левой колонке с определением в правой колонке.

1. Airplane	a. a heavier-than-air aircraft capable of vertical takeoff, vertical landing
2. Glider	b. a lighter-than-air aircraft that is not engine driven and sustains flight through the use of either gas buoyancy or an airborne heater.
3. Balloon	c. an engine-driven lighter-than-air aircraft that can be steered
4. Powered-lift	d. a powered aircraft comprised of a flexible or semirigid wing, connected to a fuselage
5. Rocket	e. it includes any part which becomes separated during the operation
6. Gyroplane	f. an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings
7. Lighter-than-air aircraft	g. aircraft of 12,500 pounds or less

8. Small Aircraft	h. an aircraft that can rise and remain suspended by using contained gas weighing less than the air
9. Powered parachute	i. an aircraft of more than 12,500 pounds
10. Airship	j. a heavier-than-air aircraft, that is supported in flight by the dynamic reaction of the air against its lifting surfaces
11. Large aircraft	k. a rotorcraft whose rotors are not engine-driven, except for initial starting, but are made to rotate by action of the air when the rotorcraft is moving

5. ULTRALIGHT VEHICLES

Study the vocabulary:

Code of Federal Regulations (CFR) (the US) - Свод федеральных нормативных актов (США)

Units of Measurement:

mile (m) - миля (единица длины, различная в разных странах)

gallon - галлон (мера жидких и сыпучих тел; *английский галлон = 4,54 л; американский = 3,78 л*)

kph (kilometres per hour) - километров в час

mph (miles per hour) - миль в час

knot - узел (единица скорости, используемая в навигации = 1,87 км в час)

accident- несчастный случай

accomplish- выполнять, совершать, осуществлять

as long as- пока

common sense- здравый смысл

comply- выполнять

for recreational purposes - для прогулочных, развлекательных целей

in level flight - в полете

legally fly – легально летать

minor physical damages- незначительные механические повреждения

powered- зд. с силовой установкой, управляемый

powered- зд. с силовой установкой, управляемый

prohibit [prə'hibit] – запрещать

prohibition [ˌprəʊ(h)ɪ'bɪʃ(ə)n] - запрет

recreational aircraft- любительский самолет

regulated aircraft- управляемый ЛА

regulated airspace - регулируемое воздушное пространство

regulations - нормативные акты

restrictions- ограничения

single-person aircraft- одноместный самолет

ultralight vehicle- сверхлегкий ЛА

unpowered - зд. без силовой установкой, неуправляемый

vehicle ['vi:kl] - транспортное средство
without permission- без разрешения

Phrases:

as long as complies with the other restrictions - пока он соблюдает иные ограничения

to invest the time and money in flight certification - вкладывать время и деньги в сертификацию полетов

related accidents – аварии на сверхлёгких ЛА

Ultralight vehicles

1. Ultralight vehicles are a type of regulated aircraft covered (*который подпадает под*) by Title 14 (*Статья 14*) of the Code of Federal Regulations (CFR) in the United States. They include all single-person aircraft used for recreational purposes that weigh less than 155 pounds (70 kg) if unpowered, or less than 254 pounds (115 kg) if powered. Additionally, they may not exceed 55 knots (102 kph or 63 mph) in level flight and cannot hold more than 5 gallons (19 liters) of fuel. In other countries, regulations differ, but the general idea is the same.
2. There are also regulations controlling the use of ultralight vehicles, which prohibit flight over towns, in regulated airspace without permission, at night, or in clouds. One of the main advantages of ultralight vehicles, however, is that one need not have a pilot's license in order to legally fly one – as long as one complies with the other restrictions. This makes ultralight vehicles the ideal recreational aircraft for those who don't wish to invest the time and money in flight certification.
3. While many people think of ultralight vehicles as more dangerous than traditional aircraft, in some ways they are safer. Because of the relatively low speeds and extremely low weight of ultralight vehicles, related accidents are very rarely fatal and often cause little more than minor physical damage. As with all flight, of course, common sense and some training play a large role in the safety of operating the vehicle, but learning to pilot ultralight vehicles can be accomplished rather easily.

EXERCISES

1. Ответьте на вопросы.

2. What aircraft do ultralight vehicles include?
3. Do regulations differ in other countries?

4. Are there regulations controlling the use of ultralight vehicles?
5. What do these regulations prohibit?
6. What is one of the main advantages of ultralight vehicles?
7. What makes ultralight vehicles the ideal recreational aircraft for those who don't wish to invest the time and money in flight certification?
8. Why are accidents very rarely fatal?

2. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

Сверхлёгкий ЛА, в полете, управляемые ЛА, одноместный самолет для прогулочных целей, управляемый, неуправляемый, нормативные акты, без разрешения, легально летать, пока, выполнять ограничения, прогулочные самолеты, тратить время и деньги на сертификацию полетов, транспортное средство, несчастные случаи, запрещать, регулируемое воздушное пространство, незначительные механические повреждения, здравый смысл, пока он соблюдает иные ограничения.

3. Переведите на русский язык следующие слова и словосочетания.

Ultralight vehicles, a type of regulated aircraft, aircraft used for recreational purposes, pound, unpowered, powered, may not exceed, kph, mph, in level flight, regulations, the general idea, prohibit flight over towns, without permission, in clouds, advantages, a pilot's license, in order to, to comply with the other restrictions, recreational aircraft, to invest the time and money, flight certification, dangerous, safer, the relatively low speeds and extremely low weight, accidents, very rarely, minor physical damage, can be accomplished rather easily.

4. Прочитайте следующие количественные числительные.

254; 145; 115; 900; 821; 356, 201; 405, 809; 2,327; 471; 562; 6,073;794

5. Найдите в правой колонке английские эквиваленты русских слов.

1. поэтому	a. feature
2. облегчать, содействовать	b. that is why
3. оправдывать	c. to facilitate

4. расширять	d. previous
5. множество, изобилие	e. used to
6. значение	f. to expand
7. ценный	g. to justify
8. особенность	h. significance
9. по направлению к	i. to expect
10. предыдущий	j. valuable
11. бывало	k. convenient
12. ожидать	l. to choose
13. удобный	m. towards
14. выбирать	n. plenty of

6. CLASSIFICATION OF AIRPLANES

Study the vocabulary:

aerial photographs- аэрофотосъемка	hull - корпус
an overall love – всеобщая любовь	natural calamity- стихийное бедствие
apart from- кроме	pilot training - подготовка пилотов
assessing a situation- оценка ситуации	providing relief- предоставление
computer-guided	missiles- помощи
управляемые компьютером ракеты	salient feature- характерная черта
counterparts - аналог	shape- формировать
counting livestock- подсчет поголовья	sophisticated - сложно устроенный,
defense - оборона	передовой, современный
durations - продолжительность	sowing seeds- посев семян
duty in natural disasters- обязанность в	spraying chemicals- распылять
случае стихийных бедствий	химикаты
extinguish - тушить, гасить, потушить	spraying insecticides- опрыскивание
facilitate- способствовать	инсектицидами
fertilizers - удобрения	to fly for a prolonged period of time-
for recreational purposes-для	летать в течение длительного
развлекательных целей	периода времени
fuel-carrying capacity- емкость для	utility - полезность, польза
перевозки топлива	

CLASSIFICATION OF AIRPLANES

Airplanes are divided into five main categories on the basis of utility and purpose. It is according to these factors that the design of an airplane is initiated, though the basic factors remain the same in all.

The main types of airplanes are as follows:

1. Commercial transport planes
2. General aviation planes
3. Military planes
4. Sea planes
5. Special purpose planes

1. Commercial Transport Planes

Commercial transport planes, or commercial planes as they are commonly known, can either be used for passengers or cargo. The size of these planes is generally larger than the other types of planes. Some of these planes are also known as airliners.

All the modern commercial transport planes use jet engines which allow them to fly at a speed as high as 500-600 miles per hour. These planes generally have a minimum of four jet engines; however, there are planes which have as many as eight. Commercial transport planes are supposed to be among the fastest type of airplanes. They have the basic structure of an airplane, comprising of a fuselage and two large wings fixed with the required jet engines. The jet engines themselves are also used in military aircraft.

A famous example of a commercial passenger plane is Boeing 747, a four jet plane. This plane can carry as many as 1000 passengers at a time and has a fuel-carrying capacity of 47,000 gallons, which allows it to fly for a prolonged period of time.

Apart from four-jet airplanes, there are also three-jet and two-jet planes. These planes have a smaller passenger-carrying capacity and cannot travel for long durations as compared to their four-jet counterparts. However, twin-jet planes are the most reliable and widely used planes in the world.

2. General Aviation Planes

General aviation planes are different types of airplanes that are commonly utilized for pilot training purposes as well as a wide variety of other uses. These are small planes with one, two, four or six seats, and have fewer engines than other aircraft. As the purpose of the vehicles requires short duration flights, these

planes usually have only a single engine. General aviation planes are also used for recreational purposes for people who have an overall love for flying.

General aviation planes are also extremely useful to farmers, who use them for sowing seeds, spraying insecticides or fertilizers over the farms, and for counting livestock. These aircraft are also useful for taking aerial photographs, assessing a situation in case of natural calamity, and for short distance transportation.

3. Military Planes

Military planes are the most sophisticated and fastest planes used by people. Utilized for defense purposes by countries, military planes are designed as the most technically advanced models around the world. Military planes are specifically used for attacking enemy areas both on land and water using various armaments from standard impact bombs to computer-guided missiles.

Military planes also carry soldiers and equipment to and from bases around the world. Unlike other types of airplanes, some of the military airplanes can be used without a runway, such as the McDonnell-Douglas Harrier, *the Mikoyan MiG-29, **the Sukhoi SU 35, which can perform vertical take-offs.

The way military aircraft are named generally stems from their purpose, whether fighter, bomber or cargo planes.

**NATO reporting name: Fulcrum - по кодификации НАТО: Fulcrum — «Точка опоры» или «Средство достижения цели»*

***NATO reporting name: Flanker-E+*

4. Sea Planes

Sea planes are a type of propeller planes which do not use jet engines. The salient feature of this type of plane is that they can land both on water as well as on sea. Sea planes can be mainly divided into different categories.

—Float planes

—Flying boats

—Amphibians

Float planes, as the name suggests, are water planes which have floats instead of wheels as to facilitate them to land on water.

Flying boats are nothing but planes which have bodies in the shape of the hull of a ship. The hull itself helps in takeoff and landing of the plane.

Amphibians are a peculiar kind of plane which are shaped as frogs. As the name suggests, amphibian planes have a design that can facilitate them to land on both water and solid surface. They have a boat hull shaped design which allows it to land on water, and also a landing gear that extends out of the hull whenever the plane wants to land on a solid surface. Amphibians are widely considered the best type of seaplanes.

5. Special Purpose Planes

Special purpose planes are made to carry out specific functions. They are used for specific tasks such as duty in natural disasters, spraying chemicals, and to providing relief during emergency situations.

An example of a special purpose plane is that of an aircraft designed to extinguishing forest fires. These planes have a provision to suck and store water from nearby ponds and lakes in large tanks. They also have spraying system which helps them to spray the water on forest fires from above.

Special purpose planes are less controlled than other aircraft in regards to naming procedures. While the company's name and model number are typically used, other titles can be given depending on their use.

EXERCISES

1. Ответьте на вопросы:

1. What engines do all the modern commercial transport planes use?
2. What plane can carry as many as 1000 passengers at a time?
3. What planes are the most reliable and widely used planes in the world?
4. What planes are commonly utilized for pilot training purposes?
5. What planes can be used without a runway?
6. What planes do not use jet engines?
7. What planes are the best type of seaplanes?
8. What planes are made to carry out specific functions?
9. What functions do special purpose planes carry out ?

2. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

самолеты авиации общего назначения, военный самолет, морские самолеты, самолеты специального назначения, польза, реактивный двигатель, емкость для перевозки топлива, летать в течение длительного

периода времени, кроме, продолжительность, партнеры, подготовка пилотов, для развлекательных целей, всеобщая любовь, посев семян, опрыскивание инсектицидами, удобрения, подсчет поголовья, аэрофотосъемка, оценка ситуации, стихийное бедствие, перевозка на небольшое расстояние, изощренный, оборона, атакующий враг, вооружение, управляемые компьютером ракеты, характерная черта, гидросамолет, способствовать, обязанность в случае стихийных бедствий, распылять химикаты, предоставление помощи, тушить

3. Верно или нет.

1. Special Purpose Planes are the most sophisticated and fastest planes used by people.
2. Special Purpose Planes are designed as the most technically advanced models around the world.
3. Military planes are specifically used for attacking enemy areas both on land and water.
4. Military planes also carry soldiers and equipment to and from bases around the world.
5. Unlike other types of airplanes, some of the civil airplanes can be used without a runway.
6. Commercial transport planes can either be used for passengers or cargo.
7. The size of commercial transport planes is generally larger than the other types of planes.
8. All the modern commercial transport planes don't use jet engines.
9. Commercial transport planes are supposed to be among the fastest type of airplanes.

4. Переведите на русский язык следующие предложения.

1. Самолеты специального назначения используются для выполнения конкретных функций.
2. Примером самолета специального назначения является самолет, предназначенный для тушения лесных пожаров.
3. Коммерческие транспортные самолеты могут использоваться для перевозки пассажиров или грузов.
4. Все современные коммерческие транспортные самолеты используют реактивные двигатели, которые позволяют им летать со скоростью до 500-600 миль в час.

5. Коммерческие транспортные самолеты считаются одними из самых быстрых типов самолетов.
6. Какие двигатели используют все современные коммерческие транспортные самолеты?
7. Какой самолет может перевозить до 1000 пассажиров одновременно?
8. Коммерческие транспортные самолеты считаются одними из самых быстрых типов самолетов.
9. Какие самолеты обычно используются для подготовки пилотов?
10. Какие самолеты можно использовать без взлетно-посадочной полосы

5. Определите, к какой части речи относятся следующие слова.

Переведите их:

achievement - achieve, resistance - resistant, assistance - assist - assistant, celebration - celebrate, difference - different, city - citizen, nation - national - nationality, measure - measurement, develop - development, act - active - activity, contain - container, discover - discovery - discoverer, literature - literary, graduate - graduation - undergraduate - post-graduate, educate - education, progress - progressive, act - action - activity - active, govern - governor - government

6. Образуйте от данных глаголов существительные с помощью суффикса *-ment*. Переведите на русский язык:

Develop, achieve, move, arrange, treat, state, improve, agree, equip, govern, require, measure, announce, pave.

7. INTERNATIONAL AVIATION ORGANIZATIONS

MIND PRONUNCIATION:

cure [kju:]	qu [kw]	ch [k]	sc [sk]	ture [tʃ] dure [dʒ]	cour[ʌ]
cure secure accurate peculiarity [pɪ,kju:lɪ'ærəti]	quarter headquarters quota equivalent quick quit quite queen quiet	technique	scattered scooter scare	creature mixture procedure	encourage courage

More pronunciation:

accidents ['æksɪd(ə)nt]

air-worthiness ['eə,wɜ:ðɪnəs]

associations [ə,səʊsɪ'eɪʃ(ə)n]

deficiencies [dɪ'fɪʃ(ə)n(t)sɪ]

efficient [ɪ'fɪʃ(ə)nt]

ensure [ɪn'fʊə]

incidents ['ɪn(t)sɪd(ə)nt]

meteorology [ˌmi:t(ə)'rɒlədʒɪ]

rescue ['reskju:]

signed [saɪn]

standardize ['stændədaɪz]

Cultural notes:

ICAO / International Civil Aviation Organization - ИКАО, Международная организация гражданской авиации

Chicago Convention - Чикагская конвенция (неофициальное название Конвенции о международной гражданской авиации)

IATA - International Air Transport Association - ИАТА, Международная ассоциация воздушного транспорта

Technical Committee - Технический комитет

IFATCA / International Federation of Air Traffic Controllers' Association - Международная федерация ассоциаций диспетчеров воздушного движения

Eurocontrol / European Organization for the Safety of Air Navigation - Евроконтроль (Европейская организация безопасности аэронавигации)

Canada ['kænədə] the second-largest country in the world, covering the entire northern half of North America with the exception of Alaska; pop. 31,902,268 (est. 2002); official languages, English and French; **capital, Ottawa**

Montreal [ˌmɒntri'ɔ:l] a port on the St Lawrence in Quebec, SE Canada; pop. 1,038,600 (est. 2002); metropolitan area pop. 3,426,350 (2001). Founded in 1642, Montreal

was under French rule until 1763; almost two thirds of its present-day population are French-speaking.

Study vocabulary:

aeroplane (Br.E) - аэроплан, самолёт	member-states - страны-участницы
aircraft (Am.E) - самолёт, воздушное судно, летательный аппарат	objective – цель, задача
affect - оказывать воздействие, влияние; касаться, затрагивать	operational techniques – методы эксплуатации
agency- агентство, управление	peculiarity - особенность, своеобразие, специфика
agreement - договор, соглашение	prevent - предотвращать, предупреждать
air traffic services – УВД, служба управления воздушным движением	regular development – постоянное развитие
air-worthiness- пригодность самолета к полету	scatter - разбрасывать, рассыпать, раскидывать; расшвыривать
conform - согласовывать	set up standards – устанавливать стандарты
coordination agency - агентство координации	sign - подписывать
creature - создание, творение, существо	spell out - разъяснить, растолковывать
enable - давать возможность	standardize - стандартизировать
encourage - ободрять; поощрять, поддерживать	taxiing – рулежка
ensure - гарантировать, обеспечивать	the upper airspace - верхнее воздушное пространство
facilities - средства, оборудование	to reduce noise – уменьшить шум
flight safety experts -эксперты по безопасности полетов	world airlines - авиакомпании
headquarters – штаб-квартира	uniform technical specifications - единые правила и процедуры технических спецификаций
incident - происшествие	
maintenance deficiencies - недостатки технического обслуживания	

1. It is known that the pioneers of aviation were men of different nationalities and of many countries: Daedalus and Leonardo de Vinci, Lilienthal and Bleriot, Mozhaiski and the Wright brothers and others. So the **aeroplane** is a **creature** of no one country's knowledge and efforts. A **peculiarity** of air transport made it clear from the start that the development of aviation was impossible without international agreement. That's why the International Civil Aviation Organization (ICAO) was created. It happened in 1944 at a

conference of 52 nations held in Chicago. At present there are about 200 member States in ICAO. Its **headquarters** is in Canada, Montreal. The working languages of ICAO are English, French, Spanish and Russian. Russia has been the member of ICAO since 1970.

2. It is very difficult to describe all of ICAO's activities. ICAO solves many problems on the international level. ICAO has a coordination **agency**. One of its purposes is to gather knowledge widely **scattered** among nations and to **standardize** the equipment and operational **techniques** used in air navigation in and over the territories of its member-states. The main task of ICAO is the flight safety. The aims of the Organization are **spelt out** in Article 44 of **the Chicago Convention**. These are to develop the principles and techniques of international air navigation, to plan and develop international air transport; to **encourage** the arts of aircraft design and operation for peaceful purposes; to encourage the development of airways, airports and air **navigation facilities** for international civil aviation, and so on.
3. **To ensure** the safe and **efficient** worldwide aviation operation ICAO has developed technical specifications forming the basis for uniform rules and **procedures**. Standardization affects the **air-worthiness** of aircraft, facilities and services required for aircraft operations elsewhere. These include: aerodromes, communications, navigational aids, meteorology, air traffic services, search and **rescue**, information services. ICAO is doing much to make the air more clear. There are special standards **to reduce noise** by designing new quieter aircraft. ICAO has **set up** standards for **air crew and controllers** as well. ICAO is also doing much **to prepare and train aviation specialists**.
4. The second in its importance organization after ICAO for international civil aviation is **IATA - International Air Transport Association** founded in 1945. It is one of the international civil aviation organizations **uniting** world airlines. IATA is concentrated on the safety problem. Its **main objective** is to **contribute to safe and regular development** of civil aviation and to cooperation of world airlines. Its Technical Committee **deals with** the problem of safety, standardization of aviation equipment, training of **flying personnel**, communications, meteorology, aerodromes, navigational aids, etc. All IATA members report the data on flying, **taxying**

and other **ground incidents** including **maintenance deficiencies**. **Flight safety experts**, aviation specialists and scientists of the member States investigate these accidents to prevent them in future. Russia is a member of IATA, it **conforms** to the IATA's standards, **procedures** and documents which is of great importance for studying and solving the problems which IATA deals with.

5. **International Federation of Air Traffic Controllers' Association (IFATCA)** was founded in 1961 with the purpose to enable the national **associations** to study and solve the problems for the development of air traffic control art and to create a better understanding among the controllers serving international aviation.
6. **Eurocontrol** is the European organization working for air navigation safety. It was created in 1963 for better service of European airspace. Some European countries have **signed** the agreement of cooperation for the safety of air navigation and organized common air traffic services in **the upper airspace**.

EXERCISES

1. Ответьте на вопросы:

1. What is ICAO?
2. When and where was ICAO created?
3. How many member States are there in ICAO?
4. Is Russia a member State of ICAO?
5. How long has Russia been the member of ICAO?
6. Where is the ICAO's headquarters?
7. What are the working languages of ICAO?
8. What is the main task of ICAO?
9. Where are the main aims of ICAO spelt out?
10. How does ICAO ensure the safe and efficient aviation operation?
11. What for are the uniform rules and procedures required?
12. What other international Civil Aviation Organizations do you know?
13. What is IATA? IFATCA? Eurocontrol?

2. Переведите слова, обращая внимание на словообразующие элементы:

active – activity
control – controller
different – difference – differently
difficult – difficulty
efficient – efficiency – efficiently
equip – equipment
facility – facilitate

investigate – investigation –
investigator
prevent – prevention – preventive
reduce – reduction
require – requirement
standard – standardize –
standardization

3. Найдите в тексте английские эквиваленты следующих слов и словосочетаний:

воздушный транспорт, известно, очень трудно, безопасность полетов, воздушная навигация, мирные цели, аэронавигационное оборудование, обеспечивать безопасность и эффективность мировой авиации, эксплуатация авиации в мире, единые правила и процедуры технических спецификаций, пригодность к эксплуатации в полёте ЛА, технические средства и обслуживание, навигационное оборудование, поиск и спасение, служба информации, конструкция самолета, уменьшать уровень шума, конструировать ЛА, установленные стандарты, готовить и обучать авиационных специалистов, проблемы безопасности, основная цель, вносить вклад в безопасное и планомерное развитие, заниматься (решением проблемы), лётный состав, руление, наземные происшествия, недостатки технического обслуживания, эксперты безопасности полета, расследовать катастрофы, решать проблему (задачу), подписать договор о сотрудничестве, верхнее воздушное пространство, мировые авиакомпании, полет самолета

4. Подберите пары слов из левой и правой колонок, имеющих сходное значение.

1. many	a. ground
2. to think	b. powerful
3. total	c. ordinary
4. to happen	d. twice
5. essential	e. to keep
6. usual	f. main
7. land	g. to obtain
8. to decide	h. towards

9. to store	i. to take place
10. everywhere	j. to consider
11. to	k. throughout
12. to get	l. all
13. two times	m. numerous
14. strong	n. to determine

5. Переведите на английский язык:

1. Ясно, что невозможно обеспечить безопасный полет без международного сотрудничества.
2. ИКАО была создана в 1944 г. на Конференции 52 наций в Чикаго.
3. Штаб-квартира ИКАО находится в Канаде, в Монреале.
4. В настоящее время в ИКАО около 200 стран – членов ИКАО.
5. Россия не была членом ИКАО до 1970 г.
6. ИКАО решает много проблем, но главная из них - безопасность полетов.
7. Основная задача ИКАО – стандартизировать оборудование и технику, используемые в воздушной навигации над территориями ее стран – участников.
8. Существуют общие правила полетов и процедуры, которые все страны – участники должны соблюдать.
9. Постоянный орган ИКАО - Совет.
10. Первым президентом ИКАО был Эдвард Вона.
11. Все авиационные проблемы выражены (даны) в 18 Приложениях к Конвенции.
12. ИКАО много делает для подготовки и тренировки авиационных специалистов, как пилотов, так и диспетчеров.
13. Имеется несколько других международных авиационных организаций гражданской авиации.
14. Члены ИАТА сообщают данные о катастрофах, которые произошли в их стране.
15. Эксперты ИАТА расследуют эти катастрофы, чтобы предотвратить их в будущем.
16. ИФАТКА помогает всем диспетчерам, обслуживающим международную авиацию, лучше понимать друг друга.

17. Евроконтроль был создан для лучшего обслуживания европейского воздушного пространства.

8. WEATHER

Study vocabulary:

Automated Surface Weather Systems - автоматизированная система сбора и обработки приземных метеорологических данных

airways - воздушная линия, воздушная трасса	destination aerodrome – аэродром назначения
along the route of flight – по маршруту полета	dew [dju:] - роса
alternates альтернатива, вариант; выбор	fog - туман
atmospheric pressure - атмосферное давление	frequency - частота
barometric [ˌbɑːrəʊ'metɪk] - барометрический	humidity [hju:'mɪdətɪ] - влажность
complete - детальный, доскональный	object – цель
continuously - постоянно, непрерывно, неизменно	record - запись, записывать
controller - диспетчер	reliability [rɪˌlaɪə'bɪlətɪ] – надёжность
descent - снижение (самолёта)	reliable [rɪ'laɪəbl] – надёжный
	storm - буря, гроза, ураган
	summed up - обобщать; подводить ИТОГ
	teletype circuits - телетайпная цепь
	to be composed of - состоять из
	visibility - видимость

1. Weather is **composed of** a number of elements such as the temperature and **humidity** of the air, atmospheric pressure, the speed and direction of the wind, **air visibility** and of special phenomena such as **fog, storms** and others.
2. Pilots need the information about weather conditions **along the route of flight** and at the **destination aerodrome**. The object of the meteorological service is to **contribute to safety, efficiency and regularity of air traffic**.

There exist some sources of aviation weather information: surface observation, radar observation, automatic meteorological observation, pilot reports and others.

3. At every airport there is a meteorological station which is **equipped with** special instruments **recording** all changes in the atmosphere. They indicate air pressure and temperature, record wind speed and direction as well as the movements of clouds. All the observations are **summed up** on special **weather charts**. The observations at the airports are made every 30 minutes and every 15 minutes if the weather suddenly gets worse or better.

Preparing for the flight the pilot is to get the latest weather information and weather forecasts along the planned route and at the point of destination and the **alternates**.

4. At a great number of metstations situated along the airways **complete** weather observations are made and then transmitted to weather forecast centres by telephone, telegraph, radio and thousands of miles of teletype circuits. Thus, the pilot has a complete picture of the weather. 20-30 minutes before entering the aerodrome area the controller gives the pilot full information about the **terminal weather**. At many airports the information helpful for **landing and take off** is continuously **broadcast** on a **navigational aid frequency**. **Prior to descent** the pilot **requests** the actual weather and aerodrome conditions for the airport he is going to land.
5. It is considered that landing of an aircraft is probably the most difficult operation which a pilot has to perform and the standards of visibility required are higher than for any other phase of flight.
6. It is known that fog, rain and clouds often **affect** the **aircraft operation**. **For many decades attempts were made** to make flying independent of weather conditions or, in other words, to allow an aircraft to land under very low or zero visibility.

Now there exist several categories set up by ICAO:

Category I - 200 ft ceiling and 1/2 mile visibility;

Category II- 100 ft ceiling and I/4 mile visibility;

Category III - landing under zero-zero conditions.

Met services for aviation require much work to collect data and prepare weather charts. This work is especially difficult for long-distance flights over vast areas with different climatic conditions.

7. Nowadays met services for aviation are almost fully automated. Automated Surface Weather Systems are installed at the airports of many countries. The System provides for the measurements, processing and display of the following meteorological parameters: wind direction and speed, air temperature and dew point, **runway visual range**, minimum cloud **height**, **barometric** pressure.
8. The use of lasers makes it possible to give pilots all the necessary information when they land under low visibility conditions. The introduction of these systems has greatly increased the **reliability** and safety of flights.

Satellite meteorology has become an independent area of science. Weather forecasts based on information from outer space make forecasts more **accurate** and help to save a great sum of money annually.

At present the work of meteorologist becomes easier thanks to computers which make calculations quicker and due to them the weather forecast service is becoming more reliable. The use of satellites and computers greatly increases the accuracy of weather forecasts.

EXERCISES

1. Ответьте на вопросы:

1. What elements are included in weather report?
2. What is the object of meteorological service?
3. How often is weather observation made at the airport?
4. What do the instruments at the meteorological stations indicate?
5. What weather information does the pilot get before the flight?
6. Do the pilots obtain weather information while in flight?
7. When does the controller give the pilot full information about the terminal weather?
8. What phase of flight does especially depend on weather conditions?
9. What weather phenomena affect the aircraft operation?
10. What categories are set up by ICAO?
11. What does Automated Surface Weather System provide?
12. When do lasers help the pilots?
13. What is the advantage of satellite meteorology?

14. What other instruments make weather forecast service more reliable?

2. Переведите слова, обращая внимание на словообразующие элементы:

accurate – accurately – accuracy –
inaccurate

depend – dependence – dependent
– independent

direct – direction

equip – equipment

observe – observation – observer

provide – provision

regular – regularity

rely – reliable – reliability –
unreliable

transmit – transmission –
transmitter

visual – visually – visibility

3. Найдите в тексте эквивалент следующим словосочетаниям:

Вносить вклад в безопасность, эффективность и регулярность воздушного движения, существует, наблюдение за поверхностью, радиолокационные наблюдения, автоматические метеорологические наблюдения, быть оснащенный, прогностические карты, метеоусловия на аэродроме посадки, передавать на частоте навигационного прибора, перед снижением, летчик запрашивает, фактические условия погоды и аэродрома, считается, the standards of visibility required требуемые стандарты видимости, фаза полета, известно, повлиять на эксплуатацию ЛА, на протяжении десятилетий было сделано много попыток, приземлиться в условиях плохой или нулевой видимости, полеты на дальние расстояния, разные климатические условия, точка росы, дальность видимости на ВПП, нижняя граница облачности, атмосферное давление, повышать надежность и безопасность полетов, спутниковая метеорология, прогнозы погоды, космос, составлять точные прогнозы погоды, ежегодно экономить огромные суммы денег, становиться более надежными, значительно повышать точность прогнозов погоды, погода аэродрома посадки, станция обеспечения полета, направление ветра, скорость ветра, давление воздуха, сводки погоды, погодные условия

4. Переведите на английский язык:

1. Погода состоит из таких элементов как температура и влажность воздуха, атмосферное давление, скорость и направление ветра, видимость.

2. Дождь, гроза, туман, шторм и другие явления опасны для полета.
3. Перед полетом пилот идет в метеобюро, чтобы получить сводку погоды и прогноз не только по своему маршруту, но и в пункте назначения.
4. В каждом аэропорту есть метеостанция со специальными приборами, регистрирующими все изменения в атмосфере.
5. Имея все данные о погоде, синоптики составляют погодную карту.
6. Во многих аэропортах информация о погоде непрерывно транслируется на определенной частоте.
7. Посадка самолета – самая трудная операция.
8. Стандарты видимости для посадки выше, чем для любой другой фазы полета.
9. Сейчас большинство метеостанций почти полностью автоматизированы.
10. Автоматическая система погоды показывает скорость и направление ветра, температуру воздуха, точку росы, дальность видимости на полосе, высоту облачности.
11. Прогноз погоды, полученный со спутников, делает его точнее.
12. Использование спутников и компьютеров повышает точность прогноза погоды.

THE PHYSICAL WORLD

A Physical features

North Pole, South Pole, Equator

continents	e.g. Asia, Europe
countries	e.g. China, Brazil
islands	e.g. Sicily, Corsica, Hong Kong
group of islands	e.g. The Bahamas [bə'hɑ:məz], The Balearics
oceans	e.g. The Atlantic Ocean, The Pacific Ocean
seas	e.g. The Red Sea, The Dead Sea
lakes	e.g. Lake Tanganyika [ˌtæŋgən'ji:kə], Lake Titicaca [ˌtɪtɪ'kɑ:kə]
rivers	e.g. The Nile, The Mississippi
falls	e.g. Niagara [naɪ'æɡ(ə)rə] Falls, The Iguacu Falls
mountains	e.g. Mount Everest, Mount Fuji ['fu:dʒɪ]
mountain ranges	e.g. The Andes, The Alps

jungles	e.g. The Amazon (also called The Amazon rainforest)
forests	e.g. The Black Forest
deserts	e.g. The Sahara [sə'hɑ:rə], The Gobi ['gəubi]

B Natural disasters (природные стихийные бедствия)

drought [draut] - засуха

monsoon- муссон

earthquake ['z:θkweɪk] - землетрясение

volcanic eruption - извержение вулкана

EXERCISES

1. Дополните предложения как в приведенном примере.

Example: The Nile is a river.

- | | |
|------------------------|--|
| 1 The Atlantic is | 8 Africa is |
| 2 The Alps are | 9 Crete and Corsica are |
| 3 Greece is | 10 Everest is the highest in the world. |
| 4 The Sahara is | 11 Michigan and Eyrie are two of the Great |
| 5 The Amazon is | 12 The 'Great Bear' is a group of |
| 6 The Mediterranean is | |
| 7 The Bahamas is | |

2. Вставьте неопределенный артикль *the* , где это требуется.

My journey took me across Atlantic Ocean from _____ Europe to _____ South America. I travelled through _____ Amazon rainforest and down through the interior of _____ Brazil as far as _____ Iguacu Falls. From there I headed north again, through Bolivia, round _____ Like Tilikaka and up to Cuzco. Then I crossed _____ Andes and finally arrived in Lima. For the last part of the journey I flew to _____ Jamaica in _____ West Indies.

3. Какие природные стихийные бедствия описываются в каждом из этих предложений?

- It lifted a car about ten feet off the ground, and then we saw it disappear down the street.
- It was about two metres deep and we watched as most of our furniture just floated away.
- The grass turned yellow and most of the crops died.

- d. The walls began to move visibly, and large cracks opened up in the ground.
- e. We could see the lava slowly advancing towards the town just ten miles away.

C. Weather conditions / Состояния погоды

Обратите внимание на словообразование прилагательных.

Существительное	Прилагательное
sun	sunny
wind	windy
cloud	cloudy
fog	foggy
shower	showery
ice	ic(e)y
heat	hot
humidity	humid

Boiling hot warm not very warm cold freezing

People round the world have different ideas about temperature:

- 5°C (five degrees centigrade) is **freezing** for many Brazilians.
- -10°C (minus ten degrees or ten degrees below zero) is very **cold** but quite normal in the mountains in Switzerland during the winter when it usually snows a lot.
- 30-35°C is **boiling** for England and very unusual, but it is very common in parts of Spain during the summer.

D Wind

a breeze a wind a strong wind a gale a hurricane ['hʌrɪkən]

- It was a hot day but there was a lovely breeze.
- The wind blew my hat off.
- The hurricane in Florida destroyed trees and buildings.

E Thunderstorms

A spell (= period) of very hot weather often ends with a thunderstorm. First it becomes very humid (= hot and wet), then you get thunder and lightning, and

finally, very heavy rain (= it pours with rain). Afterwards, it is usually cooler and it feels fresher.

EXERCISES

1. True or false?

- 1 It often pours with rain in the desert.
- 2 It gets quite chilly in the desert in the evening.
- 3 Thunder makes a noise.
- 4 Lightning can kill people.
- 5 A shower is a gentle breeze.
- 6 A spell of hot weather may end in a thunderstorm.
- 7 If it is humid, the air will be very dry.
- 8 Below zero, water turns to ice.
- 9 Heavy rain means that it is pouring with rain.
- 10 When it's foggy you need sunglasses.

2. Complete this text with suitable words.

The single greatest influence on Japanese weather is the wind. During the summer it ... from the Pacific, causing ... and humid weather, but in winter, the north-westerly ... from Siberia are very cold and it ... heavily on the mountains of the North West. The south-eastern parts receive cold dry air. Between June and mid-July, there is a ... of wet weather when the rice fields get the water vital for growth. After that, there is less ... rain, but the air is still Autumn, however, is drier, and usually very pleasant.

3. Образуйте глаголы с помощью суффикса *-en* и переведите их на русский язык:

Red, tight, soft, deep, short, dark, bright, weak, black, white, sweet, sharp, strength.

4. Выберите правильный перевод слов из предложенных вариантов. Найдите в каждом ряду слово, перевод которого дан в начале ряда.

1. огромный	a) advanced, b) flat, c) huge, d) convenient
2. дорогой	a) main, b) concrete, c) previous, d) expensive
3. отапливать	a) to heat, b) to tie, c) to increase, d) to extend

4. главный	a) shallow, b) recent, c) main, d) huge
5. преимущество	a) shortage, b) strength, c) effort; d) advantage
6. резать	a) to perform, b) to cut, c) to beat, d) to shake
7. единица	a) place, b) unit, c) shape, d) hole
8. собирать	a) to put up, b) to solve, c) to wear, d) to assemble
9. передовой	a) advanced, b) expensive, c) ordinary, d) similar
10. нехватка	a) duration, b) damage, c) shortage, d) strength

9. AIRPORT

Study the vocabulary:

aeronautical [ˌɛərəˈnɔ:tɪk(ə)l] charts
полетная карта

air piracy ['paɪərəsi] - воздушное
пиратство

air route traffic control - управление
воздушным движением (УВД) на
маршруте

air traffic control (АТС) - управление
воздушным движением (УВД)

air traffic control services – служба
управления воздушным движением

airfreight - воздушная грузоперевозка

airport traffic control - управление
воздушным движением в зоне

аэропорта

approach control - управление заходом
на посадку

apron - приангарная площадка; перрон

carousel [ˌkærə'sel] - карусель

circumstance ['sɜ:kəmstæn(t)s] -

обстоятельство; случай; условие

cow pasture ['rɔ:stʃə] – пастбище для
коров

depend on – зависеть от

diversified - различный, разнообразный,

establish – учреждать, устанавливать

a fire brigade – пожарное формирование

hangar ['hæŋgə] - ангар

interference [ˌɪntə'fɪər(ə)n(t)s]-

вмешательство

lead (led) - вести, сопровождать

maintenance - текущий ремонт,

регламентные работы, ТО

moreover – более того

overhaul – капитальный ремонт

proper landing and take-off facilities –

соответствующее требованиям

оборудование для взлета и посадки

repair - ремонтировать, ремонт

rescue service - аварийно-спасательная
служба

runway - взлётно-посадочная полоса,
ВПП

security service - служба обеспечения
безопасности

supplementary services - дополнительные
услуги

taxiway - рулѐжная дорожка

terminal area - зона терминала

tow [təu] tractor - тягач

vehicle ['vi:kl] - транспортное средство

water truck - автомобиль-цистерна

weather minima - минимальные

метеоусловия

weather observation and forecasting

service – метеослужба

1. There are airports in every country. In theory, an aircraft can fly an **infinite number of paths** through the air from any surface point to any other. In practice, **paths of flight** lead from airport to airport. Aircraft not only need proper landing and take-off facilities. Moreover, those who use aircraft need services and **accommodations** which the airport must provide.
2. In the early days of aviation when aeroplanes were small a **cow pasture** could be used as a "flying field". But with the continuous **increase** of air traffic and the introduction of **high-capacity aircraft** it became necessary to **expand** airport facilities, to build new terminal buildings and to construct new airports.
3. In the interest of aviation safety and **air traffic assistance and control** *air traffic rules* were **established**. The rules relate chiefly to weather minima, **flight altitudes** and traffic patterns which are to be used under different **circumstances**. Much can be learned about the nature of a specific airport from **aeronautical charts** which pilots use. For example, the chart reveals the type and size of an airport, the **radio facilities** it uses and its altitude and location.
4. The modern airport is a complex structure, a centre of most **diversified** services. Millions of passengers and thousands of tons of airfreight are **handled** by modern airports. Thousands of people are working at airports.
5. In practical any airport can be divided into two main parts: the landing area (**runways and taxiways**) and the **terminal area (aprons, buildings, car parking areas, hangars, etc.)**. There is also a third part - **terminal air traffic control**. The landing area includes runways and taxiways. The number of runways, their length and location depend on the volume and character of traffic, the **prevailing wind direction** and other factors.
6. The runways and taxiways should be arranged so that to **prevent delays** on landing, taxiing and take off operations.

Aprons are required for aircraft to make final checks prior to **departure**.

The main function of the terminal buildings is to handle the departing and arriving passengers and their baggage.

Among the airport services are: **flight assistance service**, air traffic control services - airport traffic control, **approach control**, **air route traffic control**, radio communications and weather observation and forecasting service.

7. At every airport there is a number of **supplementary services** such as **rescue and security services**, an airport clinic, a **fire brigade**, **special vehicles** and equipment units (water trucks, **tow tractors**, etc.).
Other services include **maintenance, overhaul and repair of stationary and mobile equipment**, the supply of electricity, water, heat and air conditioning. The facilities include runways, air navigational aids, passenger and **cargo terminals**. The airport has a hotel, a post office, bank offices, restaurants, **car rental firms**, etc. In the terminal there is everything for quick passenger handling: **check-in desks**, electronic flight information board of departure and arrival times, **the baggage claim carousel** and many others.
8. Nowadays there exists one more pressing problem - that of **air piracy**. The number of acts of **unlawful interference resulted in** deaths and **injuries** of some hundreds of persons. So the ICAO Council has adopted Amendment 8 to Annex 17 (Security). The Amendment covers **security screening** and inspecting passengers, checked baggage, security control over cargo, courier and express parcels and mail. Every airport has new specific **detection systems** capable to screen airline passengers and their baggage within less than 8 seconds.

EXERCISES

1. Ответьте на вопросы:

1. Why was it necessary to build new terminal buildings and construct new airports?
2. Why were air traffic rules established?
3. What do these rules relate to?
4. What does the aeronautical chart reveal?
5. What are the main two parts of the airport?
6. What is the third part of the airport?
7. What factors influence the number of runways, their length and location?
8. What does the aircraft crew do on the apron?
9. What is the main function of the terminal building?
10. What airport services do you know?
11. What supplementary services are there at the airport?
12. What does the electronic information board indicate?
13. What equipment is used at the airport for preventing piracy?

14. How many airports are there in Petersburg?
15. What is the distance between the center of the city and Pulkovo-1?
16. How can you get to the airport?
17. Is there an airport in your native city?
18. Is it an international or domestic?

2. Переведите слова, обращая внимание на словообразующие элементы:

continue – continuation – continuous – continuously
introduce – introduction – introductory
necessary – necessity – necessitate
divide – division – divider
depend – dependent – dependence
prevent – prevention – preventive
detect – detection – detective – detector
depart – departure
arrive – arrival

3. Найдите в тексте английские эквиваленты следующих слов и словосочетаний:

бесконечное число, очень много, траектория полета, из аэропорта в аэропорт, правильное оборудование для взлета и посадки, предоставлять услуги и обеспечивать помещением, с появлением авиации, непрерывный рост, воздушное судно большой вместимости, стало необходимым, расширять аэродромные службы, строить новый аэровокзал, строить новые аэропорты, правила в основном относятся, высота полета, схема организации воздушного движения, использовать при определенных условиях, средства радиосвязи, высота и местоположение, сложная структура, центр разнообразных услуг, осуществлять воздушные грузоперевозки, зона терминала, зона посадки, место для парковки, длина ВПП, преобладающее направление ветра, предотвратить задержку, проводить выходной контроль, перед вылетом, радиосвязь, медпункт, пожарное формирование, спецтехника и оборудование, стационарное и передвижное оборудование, аэронавигационное оборудование, грузовой терминал, аренда авто,

стойка регистрации, электронное табло времени вылета и прилета, зона получения багажа (круговой транспортёр для багажа в аэропорту), незаконное вмешательство, привести к смертельному исходу и травмам, контрольный досмотр вещей и пассажиров, система обнаружения, правила управления воздушным движением, средства посадки и взлета, схема движения

4. Переведите на английский язык:

1. Почти в каждом городе есть аэропорт, большой или маленький.
2. Размер аэропорта зависит от объема перевозимых пассажиров и груза.
3. Современные аэропорты обслуживают миллионы пассажиров и перевозят огромное количество груза.
4. С увеличением воздушного транспорта и с введением новых современных самолетов старые аэропорты расширяются и реконструируются.
5. Для обеспечения безопасности полетов существуют правила воздушного движения.
6. Прибывающие и убывающие пассажиры обслуживаются в здании аэровокзала.
7. Число ВПП зависит от объема перевозок.
8. Расположение ВПП зависит от преобладающих направлений ветра.
9. Пилот пользуется аэронавигационными картами.
10. Эти карты указывают тип и размер аэропорта, его радиосредства, длину и расположение ВПП и т.д.

5. Образуйте от данных глаголов существительные с помощью суффикса *-ment*. Переведите на русский язык:

develop, achieve, move, arrange, treat, state, improve, agree, equip, govern, require, measure, announce, pave, amuse, argue, advertise, invest

6. Прочитайте и переведите на русский язык текст LONDON AIRPORT без использования словаря.

LONDON AIRPORT SERVES THE WORLD

1. If you have travelled by plane (we also say "by air"), you will probably agree that travelling by plane is a very exciting experience. An airport is so

different from a railway station or a bus stop, the people you meet and the things you see are very interesting and new. What is more, a big airport is like a town - with its own shops, banks and police.

2. London airport is one of the most modern in the world today and is a popular visiting place for both old and young. The airport covers over four square miles, and the road round it is 13 miles long. The airport has five main runways: the longest is 12,000 feet. The total number of people who work at the airport is nearly 36,000. London airport is one of the busiest in the world - more than 50 airlines operate from it every week. Every day of the week in the summer, over 800 planes land or take off.
3. London airport is unique in its layout. All passenger and control buildings are in the centre of the airport. The only way for passengers to approach these buildings is by a tunnel which has been constructed under the main runways.
4. This great airport is famous for the efficiency of its service to the passengers who are continually travelling to all parts of the world. At the airport, all luggage is mechanically handled. This is done by a system of conveyor belts, which enables the passengers to pass this great airport with ease.
5. The cost of making such an airport was approximately 20 million, but much more will be spent before the work is completed. Each year money is needed for the development of the airport to accommodate great new transatlantic aircraft. Runways have to be lengthened to enable these airplanes to take off with their heavy loads. Air bus system started in 1977.
6. The English, as you know, like animals very much. You will not be surprised, therefore, when we tell you that London airport has a special animal "hotel". Every year, thousands of animals arrive at London airport. Some stay the night there; others stay several weeks. Some just go to have a drink of water and a rest. The "hotel" looks after birds, insects, fish, elephants, monkeys and spiders.

MIND YOUR GRAMMAR!

Цепочка определений

Если между артиклем (или другим определителем) и существительным, к которому он относится, стоит несколько существительных, они образуют цепочку определений, а существительное, к которому относится артикль, является по отношению к ним опорным. С него рекомендуется начинать перевод цепочки определений.

Определения же могут переводиться следующим образом:

1) прилагательным:

a steam turbine - паровая турбина

2) существительным в родительном падеже:

the airplane wing - крыло самолета

3) существительным с предлогом:

a steam engine car - автомобиль с паровым двигателем

4) группой существительных:

the car speed calculation problem - проблема вычисления скорости автомобиля

Переведите на русский язык следующие цепочки определений:

1. Landing and take-off facilities, high-capacity aircraft, control air traffic rules, terminal air traffic control, the landing area, landing, taxiing and take off operations, air traffic control services, airport traffic control, approach control, air route traffic control, weather observation and forecasting service, rescue and security services, stationary and mobile equipment repair, car rental firms, flight information board, security screening, specific detection systems
2. door lever ['li:və], fuel tanks, upper deck, discharge valve, ground servicing operations, left forward passenger door, nose landing gear uplock box, aft cargo compartment door proximity detector, outer RH flap track fairing attachment bolt heads, left engine mounting bolt washer, upper rudder servo drive rod, nose gear ground safety pin.

EXERCISES

1. Ответьте на вопросы:

1. Why is a big airport like a town?
2. How do the passengers approach the centre of the airport?
3. What helps the passengers to pass London airport easily and quickly?
4. What accommodation does London airport have for animals?
5. What does the "hotel" look after?
6. Is travelling by plane a very exciting or a very sad experience?
7. What is a big airport like?
8. How many main runways does the airport have?
9. What is this great airport famous for?
10. What special "hotel" does London airport have?

2. Назовите антонимы следующих слов.

Before, bright, busy, break, fat, clean, cold, dark, difficult, increase, independence, hard, destroy, tiny, wet, lock, wide, weak, unknown, thin, short, damage, external, unlock, ancient, disagree, nothing, together, never, depart, above, the worst, repair, sell.

3. Найдите в тексте английские эквиваленты следующих слов и словосочетаний.

отличаться от, охватывать, очень волнующее событие, отличаться от, самый современный в мире, взлетно-посадочная полоса, самый загруженный, приземляться, взлетать, добираться, заход на посадку, славиться, багаж, система транспортерных лент (карусель), размещать, соглашаться, самый современный в мире, один из самых загруженных в мире, под ВПП, весь багаж обрабатывается механически, взлетно-посадочные полосы должны быть удлинены, взлетать с тяжелым грузом, прибывать в аэропорт

4. Верно или нет.

1. London airport is one of the oldest in the world.
2. A big airport is like a town - with its own shops, banks and police.
3. The airport covers over five square miles, and the road round it is 15 miles long.
4. The airport has five main runways: the longest is 12,000 feet.

5. Every day of the week in the summer, over 800 planes land or take off.
6. All passenger and control buildings are at the end of the airport.
7. Every year hundreds of animals arrive at London airport.
8. The only way for passengers to approach these buildings is by a tunnel.
9. London airport is unique in its layout.
10. The cost of making such an airport was more 20 million.

5. Переведите на английский язык.

1. Путешествие на самолете - это очень увлекательное занятие.
2. Люди, которых вы встречаете, и вещи, которые вы видите, очень интересны.
3. Большой аэропорт похож на город - со своими магазинами, банками и полицией.
4. Лондонский аэропорт является одним из самых современных в мире.
5. Аэропорт занимает более четырех квадратных миль, а дорога вокруг него составляет 13 миль.
6. Аэропорт имеет пять основных взлетно-посадочных полос: самая длинная 12000 футов.
7. Лондонский аэропорт является одним из самых загруженных в мире.
8. Каждый день приземляются или взлетают более 800 самолетов.
9. Лондонский аэропорт уникален по своей планировке.
10. Все пассажирские и диспетчерские здания находятся в центре аэропорта.
11. Взлетно-посадочные полосы должны быть удлинены, чтобы позволить самолетам взлетать с тяжелым грузом.
12. Каждый год тысячи животных прибывают в Лондонский аэропорт.

10. AIRCRAFT INSTRUMENTS

Study vocabulary:

Units of measure:

foot – feet - фут (единица длины; = 30,48 см; = 1/3 ярда)

feet per minute (fpm) – футов в минуту
MSL (mean sea level) - средний уровень моря

Navigation instruments:

- airspeed indicator- указатель скорости
- altimeter - высотомер
- Heading Indicator- указатель курса
- Vertical Speed Indicator (VSI - вариометр, указатель вертикальной скорости
- Attitude Indicator- авиагоризонт
- Mach number- число Маха (*отношение скорости самолета к скорости звука*)
- Turn Coordinator- указатель поворота, координатор разворота

aircraft instruments – бортовые приборы ЛА
ascend- набирать высоту
attitude- ориентация, угловое положение ЛА
descend- снижаться
electrically powered- электрический привод
environment – окружающая среда
for presenting – для предоставления
gyroscopic- гироскопический
north-seeking- направленный к северу

obtaining information – получение информации
pitch attitude and bank – угол тангажа и крен
the behavior of the engines- поведение двигателей
to be concerned with- заниматься
type code- код типа
vacuum-driven- вакуумный привод
variables encountered- обнаруженные перемены
whereabouts- местонахождение

Aircraft instruments

1. Aircraft instruments are basically devices for **obtaining information** about the aircraft and its environment and for presenting that information to the pilot. Their purpose is to detect, measure, record, process and analyse the **variables encountered** in flying an aircraft. They are mainly electrical, electronic or **gyroscopic**. Modern aircraft have a computer on board. They **are concerned with** the behavior of the engines, the speed, height and attitude of the aircraft and its **whereabouts**. Instruments concerned with the whereabouts of an aircraft are navigation instruments.

2. There are six traditional flight instruments in most aircraft cockpits. These six basic flight instruments are the main source of cockpit flight information for pilots and are divided into two categories: static (or pitot-static) instruments and gyroscopic instruments.

Static/Pitot-Static Instruments

3. *Airspeed Indicator*: The airspeed indicator tells the pilot the indicated airspeed in knots (or in some cases, a Mach number). Airspeed is sometimes also depicted in true airspeed, which is valuable information for flight planning. (True airspeed is the actual speed of the airplane in relation to the air and is corrected for temperature and density effects.
4. *Altimeter*: The altimeter reflects the aircraft's vertical height above MSL (mean sea level) corrected for outside air pressure. The pilot sets the appropriate pressure setting (a local setting for those flying below 18,000 feet) and the altimeter will depict the corresponding altitude above MSL. When the airplane ascends or descends, the air pressure will decrease or increase, respectively.
5. *Vertical Speed Indicator*: Vertical speed is the rate of the aircraft's climb or descent, usually depicted in feet per minute (fpm) on a vertical speed indicator (VSI). In level flight, the VSI needle points to '0' feet.
The VSI is valuable in determining if the airplane is climbing or descending and the rate of the climb or descend. There can be a slight lag in information depicted on the VSI if the aircraft is maneuvered abruptly. In turbulence, the indications can be slightly erratic.

Gyroscopic Instruments

6. *Attitude Indicator*: The attitude indicator is possibly the most important instrument for pilots. In one glance, a pilot can tell if the aircraft is climbing, descending, turning or straight and level. It gives a direct indication of changes to pitch attitude and bank. The attitude indicator consists of an artificial horizon that is a background for a miniature airplane.
7. *Heading Indicator*: A basic tool for navigation, the heading indicator provides directional information to the pilot similar to the way a magnetic compass does. The heading indicator itself is not north-seeking but can depict an

accurate heading when aligned to a magnetic compass. The heading indicator is a gyroscopic instrument and can be vacuum-driven or electrically powered. As the aircraft turns left or right, the heading indicator will change to depict a new heading between zero and 359 degrees on a compass card.

8. *Turn Coordinator*

The turn coordinator is another gyroscopic instrument that can be either electric or vacuum-driven. It's one of the simplest instruments, with a miniature airplane that dips its wings one way or another to show the rate of turn or rate or roll. When a pilot rolls the airplane into a turn, the miniature airplane quickly shows a corresponding roll.

9. An aircraft usually takes the name of the designer or manufacturer. Here are some of the Russian designers: Tupolev, Ilyushin, Antonov, Yakovlev. Manufacturer's names are represented by Boeing, Douglas, Lockheed and others. The name of the designer or manufacturer is followed by a type code, known in some airlines as a class. For example: the Ilyushin-96 (designer's name and type code), the Boeing-747 (manufacturer's name and type code).

EXERCISES

1. **Ответьте на вопросы:**

1. What does aviation provide?
2. Where are helicopters used?
3. What types of aircraft do you know?
4. Name the main parts of the aircraft.
5. What does the fuselage contain?
6. What for are the wings required?
7. What are the components of the wing?
8. What does the tail unit provide?
9. What is the power plant?
10. What types of engines do you know?
11. When are the landing gears used?
12. What is the purpose of aircraft instruments?
13. What Russian and foreign designers do you know?
14. What name does the aircraft take?

2. **Переведите слова, обращая внимание на словообразующие элементы:**

apply - application
contribute – contribution
measure – measurement
move – movement – movable
possible – possibility – impossible
power – powerful
provide – provision
require – requirement
retract – retraction – retractable - unretractable
transport – transportation

3. Найдите в тексте английские эквиваленты следующих слов и словосочетаний:

авиационные приборы, обнаружение, измерение, запись, электрические, электронные, гироскопические, устройства для получения информации, представление информации пилоту, поведение двигателей, компьютер на борту, скорость, высота, местонахождение, угловое положение ЛА, навигационные приборы, самолету обычно дают имя конструктора, индикатор вертикальной скорости, указатель курса, указатель поворота, высотомер, вертикальную высоту самолета, (средний уровень моря, давление воздуха, устанавливать, настройка давления, набирать высоту, снижаться, давление воздуха, уменьшаться, увеличиваться, указатель вертикальной скорости, скорость набора высоты, скорость снижения самолета

4. Переведите на английский язык:

1. Авиационные приборы являются устройствами для получения информации о воздушном судне.
2. Современные самолеты имеют компьютер на борту.
3. В большинстве самолетов есть шесть традиционных авиационных приборов.
4. Они являются основным источником информации о полете в кабине пилотов и делятся на две категории: статические и гироскопические приборы.
5. Индикатор скорости полета сообщает пилоту истинную скорость полета в узлах.

6. Когда самолет поднимется или спускается, давление воздуха соответственно уменьшается или увеличивается.
7. В кабине пилота много приборов, показывающих скорость и высоту полета, работу двигателя и другую информацию.

5. Соотнесите наименования приборов в левой колонке с выполняемой им функцией в правой колонке.

Term	Definition
1. Turn Coordinator	a. tells the pilot the indicated airspeed
2. Heading Indicator	b. reflects the aircraft's vertical height above MSL (mean sea level)
3. Airspeed Indicator	c. is valuable in determining if the airplane is climbing or descending and the rate of the climb or descend
4. Attitude Indicator	d. the most important instrument for pilots. e. It gives a direct indication of changes to pitch attitude and bank.
5. Vertical Speed Indicator	f. provides directional information to the pilot
6. Altimeter	g. shows the rate of turn or rate or roll.

11. SAFETY

Study the vocabulary:

SARPS (International Standards and Recommended Practices) – САРП, Международные стандарты и рекомендации по их применению
achievement- достижение

airline safety practices - правила безопасности авиакомпании
constantly taking steps- постоянно предпринимать шаги
crash- авария, авиакатастрофа
disciplines- преподаваемые дисциплины
engineering- радиотехника
ensure- обеспечивать
failure- неисправность

hazardous weather conditions – опасные погодные условия
malfunctioning of airborne and ground aids – неисправность бортовых и наземных средств
meteorology- метеорология
prevention of collisions- предотвращение столкновений
proficiency- умение, мастерство

revise the provisions- пересмотреть
положения
rigid (strict) procedures- жесткие
(строгие) процедуры

safety – безопасность
sufficient - достаточный

PHRASES:

to cover all of the potential situations- чтобы охватить все возможные ситуации

1. Safety is the most important problem in aviation. The **prevention of collisions** between aircraft in the air and on the ground is the main task of aviation specialists.
2. The **achievement** of aviation safety is the result of progress in many sciences and **disciplines** including **engineering**, aerodynamics, **meteorology**, psychology, medicine and economics.
3. Safety is **ensured** by thousands of ICAO and governmental regulations, by high standards in the design and manufacture of an aircraft and by **rigid (strict) procedures of airline safety practices**.
4. The aviation industry is **constantly taking steps** to prevent accidents but the **crashes** do occur time after time. They result from different causes: **failure** in the aircraft structure, human errors, navigational failures, **malfunctioning of airborne and ground aids**, **hazardous weather conditions** and so on.
5. Poor knowledge of English can also contribute to or result in an accident or incident. Therefore ICAO **revised the provisions** related to the use of the language for radiotelephony communications and demands good discipline to follow more closely to standard phraseology in all air-ground exchanges.
6. Experience has shown that phraseology alone is not sufficient to cover all of the potential situations, particularly in critical or emergency situations. That's why proficiency in common or plain language is also of great importance.
7. One of ICAO's chief activities is standardization in all spheres of aviation operations. The main ICAO document is SARPS (International Standards and Recommended Practices). Its main task is to provide the necessary level of standardization for safe and regular air operations.

EXERCISES

1. Ответьте на вопросы:

1. What is the most important problem in aviation?
2. What is the main task of aviation specialists?
3. By what means is safety ensured?
4. What factors may cause accidents?
5. What can you say about the role of language in the problem of safety?
6. Can radiotelephony alone cover all of the potential situations?
7. What is the main document ICAO?
8. What is the main task of SARPS?

2. Переведите слова, обращая внимание на словообразующие элементы:

achieve – achievement
care – careful – careless –
carelessness
close – closely
collide – collision
communicate – communication
– communicative – community
critical – critically – criticize –
criticism – uncritical
danger – dangerous –
dangerously
differ – different – differently –
difference
ensure – insurance
fail – failure
govern – governor –
government – governmental
hazard – hazardous
know – knowledge – unknown
navigate – navigator –
navigation – navigational

necessary – necessarily –
necessity – unnecessary
prevent – preventive –
prevention
proficient – proficiently –
proficiency
provide – provision – provider
regular – regularly – regulation –
regularity – irregular
relate – relation – relative –
relatively – relativity
safe – safety – unsafe
special – specially – specialist –
speciality – specialize –
specialization
sufficient – sufficiently –
sufficiency – insufficient
terror – terrible – terribly –
terrific

3. Переведите на английский язык:

1. Самая важная проблема в авиации – безопасность.
2. Для обеспечения безопасности полетов ИКАО установила специальные правила и процедуры.
3. Все государства – члены ИКАО должны строго соблюдать все правила и процедуры, принятые ИКАО.
4. Одна из самых задач авиационных специалистов – предотвращать столкновение самолетов в воздухе и на земле.
5. Достижения в технике, аэродинамике и других науках повышают авиационную безопасность.
6. Еще одним условием, обеспечивающим авиационную безопасность, является стандартизация во всех авиационных операциях.
7. Всем авиационным специалистам очень важно знать английский язык.
8. Хорошее знание английского языка необходимо для обеспечения безопасности полетов.
9. Причина катастрофы - человеческая ошибка.
10. Самолет не смог вылететь из-за опасных погодных условий.
11. Отказ двигателя привел к катастрофе.
12. В районе аэропорта аварийная ситуация.
13. Одна из главных задач ИКАО – обеспечивать необходимый уровень безопасности.

4. Образуйте прилагательные с помощью суффикса *-ous*. Переведите их на русский язык:

fame, nerve, danger, adventure, poison, marvel, courage, luxury, vary, ridicule, humour, industry

5. Сделайте правильный выбор. Переведите предложение.

1. What is the (long, length) of the corridor?
2. How (long, length) is the street?
3. He is not (strong, strength) enough to fight with John?
4. My brother can lift the box because of his (strong, strength).
5. Nelly's skirt is too (wide, width).
6. We can't get the piano through the door because of its (wide, width).

7. Is spring a (warmth, warm) season?
8. We felt the (warm, warmth) of the sun on our faces and hands.
9. We were surprised at your formal (polite, politeness).
10. We were not struck by the (white, whiteness) of the snow.

12. AIRPLANES AND SECURITY

Study the vocabulary:

sniffer dog — собака-ищейка
 advantage — преимущество
 air pollution — загрязнение воздуха
 air traffic control tower — башня
 авиадиспетчера
 convenient — удобный
 damage — повреждение, ущерб
 environment — окружающая среда
 identity — личность
 machine-powered flight —
 управляемый полет на машине
 miracle — чудо
 scrutiny — зд. находиться под
 пристальным контролем/
 вниманием
 thermal imaging — термальное
 изображение
 to allocate — размещать,
 распределять

calm fears — развеять страхи
 to depend on — зависеть от чего-л.
 to hijack — угонять самолет
 to increase — увеличивать '
 to involve — вовлекать
 to monitor — проверять,
 контролировать
 to reveal — выявить, раскрыть
 to run smoothly — пройти гладко
 to screen — демонстрировать на
 экране, отображать
 to shrink (past shrank, p.p. shrunk) —
 зд. сокращаться
 to take for granted — воспринимать
 что-либо как само собой
 разумеющееся
 to tend — иметь тенденцию

1. A few hundred years ago the main forms of transport were walking or riding a horse, donkey, camel and elephant, depending on where you lived. Nowadays, in most countries long journeys involve some form of motorized transport. People today tend to travel longer distances, more often and at much higher speeds. As a result the world has shrunk over the last century and we now live in a global economy.

2. There are great advantages in this, but there is a down side too. More travel has also resulted in noise and air pollution, increased stress and damages to local environments and the larger ecosystem.
3. Airplane travel is the fastest, more convenient means of travelling, because it saves our time and sometimes money. For instance, in the USA, if you travel from east coast to the west by air jet, it results cheaper for you than to travel by train.
4. In 1903, the Wright brothers made the first controlled machine-powered flight. It only lasted 12 seconds but changed the world forever. A century later, air travel is no longer a miracle; it's something, we take for granted. One billion air passengers now fly every year — that's equivalent to a sixth of the world's population.
5. Is it safety to travel by plane? Before September, 11, 2001, it used to be a relatively safe travel. On September, 11, terrorists attacked on America. Since then security at airports and in the skies has been under scrutiny. That day four passenger planes were hijacked, more than 4,000 people killed.
6. On busy summer's days, thousands planes travel through skies. To make sure everything runs smoothly, there are air traffic control centres. In addition, every airport has an air traffic control tower. Every square meter of airspace is allocated to an air traffic controller. As an aircraft travels through the air, it is monitored by the controller responsible for that sector of airspace. To calm fears about terrorist hijacks, airports are looking into new technologies that reveal passengers' identities.
7. Previously in the US, less than 10% of luggage was screened. Under new legislation, every item must be checked by one of three following methods: sniffer dogs, bomb detection machines, extensive manual searches. Around the globe, security firms are working on new devices that can detect materials such as ceramics — which can be made into guns. One such scanning camera has been developed in Britain. It uses thermal imaging technology originally created to help pilots see through fog and cloud.

EXERCISES

1. Ответьте на вопросы:

1. What was the main means of transport a few centuries ago?
2. How did travels affect ecology?

3. Is it a miracle to travel by plane today?
4. Is it safety to travel by plane?
5. How do they make sure everything runs smoothly?
6. Why are the airports looking into new technologies that reveal passengers* identities?
7. What are the main methods of baggage checking?
8. What are security firms working on today?

2. Найдите в каждом ряду слово, образованное от первого слова ряда.

- | | |
|-------------|---|
| 1. science | a) steadily, b) scarcely, c) scientist, d) site |
| 2. land | a) among, b) landing, c) last, d) later |
| 3. simple | a) steamer, b) side, c) simplicity, d) shift |
| 4. ordinary | a) obtain, b) outside, c) often, d) extraordinary |
| 5. furnish | a) offer, b) furnishing, c) turn, d) though |
| 6. discover | a) discovery, b) determine, c) degree, d) development |
| 7. refuse | a) research, b) receiver, c) refusal, d) requirement |
| 8. soon | a) closer, b) sooner, c) else, d) once |
| 9. steady | a) simple, b) carry, c) safely, d) steadily |
| 10. world | a) work, b) worldly, c) way, d) weak |

3. Многозначность слов. Изучите значения слова *hand*. б) Затем переведите предложения, обращая внимание на различные значения этого слова.

hand *n.* 1) рука; 2) работник, исполнитель; 3) *pl.* команда корабля; 4) почерк; 5) стрелка (часовая); 6) участие в чём-л.

v. передавать, вручать

1. Where can I wash my hands?
2. Will you hand me that pencil?
3. You can see his hand in this experiment.
4. He worked several years as a farm hand.
5. Do you have a hand in this project?
6. The hour hand of my watch is broken.
7. The letter was written in a strange hand.
8. He handed me a telegram.

4. Переведите данные предложения без словаря, обращая внимание на выделенные слова.

trouble 1) проблема 2) трудность 3) авария 4) неисправность

extra 1) дополнительный, специальный, особый 2) лишний 3) экстренный

fast 1) быстрый, скорый 2) оперативный 3) стремительный

gain 1) получать, добывать 2) приобретать 3) достигать 4) набирать

1. I never have any **trouble** getting the car started.

There is some **trouble** with the central heating system.

Cars with engine **troubles** of this sort are easily repaired at every service station.

Stoppage of fuel supply caused serious **trouble** in the engine.

2. The bombers were quickly converted for use by passengers by fitting **extra** seats and windows.

Have you got an **extra** ticket?

On Sundays they run an **extra** train.

People who work and study get **extra** leave during examination time.

3. After World War II, bigger and **faster** airliners appeared.

If you can get a ticket for the **fast** train, you'll get there in the morning.

Which of you runs **faster**?

The plane is the **fastest** means of transport.

4. Helicopters **gain** in needing very little space for taking-off and landing.

You can **gain** by watching how she works.

The plane rapidly **gained** height.

5. Переведите следующие предложения на русский язык, обращая внимание на союзы условных придаточных предложений *if* (если), *unless* (если, пока не), *provided* (при условии)

1. If they needed the equipment urgently, we could transport it by plane.

2. The accident would not have happened, if they had been more careful.

3. If I were in his place, I would refuse to stop the experiment.

4. If the goods are shipped in April, they will arrive before the expedition starts.

5. The sputnik will keep to its orbit provided it travels at the uniform speed of 8 kilometres per second.

6. It would have been impossible to send up sputniks unless the laws governing the motion of planets had been studied.
7. If I were you I would first test the car.
8. You'll fail in English unless you work harder.

6. Найдите в правой колонке перевод слова.

1. товары	a) vehicle, b) stages, c) substance, d) goods
2. значить, иметь ввиду	a) to drag, b) to mean, c) to pay, d) to justify
3. грузовик	a) driver, b) coal, c) lorry, d) railway
4. экипаж, автобус	a) safety, b) coach, c) tube, d) traffic
5. тот же самый	a) in turn, b) backward, c) the same, d) total
6. колесо	a) wind, b) weight, c) light, d) wheel
7. двигатель	a) engine, b) lorry, c) source, d) force
8. из-за	a) without, b) within, c) because of, d) directly
9. почва, грунт	a) step, b) strength, c) piece, d) soil
10. поверхность	a) delay, b) surface, c) top, d) wood

13. AIR TRAFFIC CONTROL

Study the vocabulary:

adequate facilities – адекватные условия

an instinct for team work – умение работать в команде

assists in – оказать помощь

carry out – проводить

dominate – доминировать, преобладать

exacting duties – строгие обязанности

give assistance – оказать помощь

human controller – оператор

orderly flow of traffic –

упорядоченный поток трафика

possess – обладать

prevention of collision –

предотвращение столкновений –

proficient – опытный

readiness for decisions – готовность к принятию решений

reduce the separation minima –

уменьшить минимумы эшелонирования

slightest error – небольшая ошибка

sound critical judgment – здоровое

критическое суждение

taking over routine tasks – решение

ежедневных (рутинных) задач

vital requirement – жизненные

потребности

work under high stress – работать

энергично

быстро, напряжённо,

1. The ATC's first concern is safety that is the **prevention of collision** between aircraft in the air and **orderly flow of traffic**.

To perform their **exacting duties** air traffic controllers need adequate facilities. The introduction of radars greatly **assists in** expediting the flow of traffic **reducing the separation minima**. Computers are also a powerful tool. They give assistance by **taking over routine tasks** but they must not dominate the system. The human controller is much more efficient than any current system because it is he who takes responsibility for controlling aircraft and it is he who takes final decisions in all situations including conflicting and emergency.

2. During periods of heavy traffic controllers work under high stress. They may control several aircraft simultaneously, their number sometimes exceeding 15 and even more. Controllers' slightest error may cause loss of human lives and property.

Top physical and mental condition is a vital requirement for ATC controllers. Therefore they undergo strict medical examination which are repeated at periodic intervals.

3. The problem of the selection and training of ATC personnel is extremely important. The controllers should possess a number of qualities which are absolutely necessary for them: a high degree of morality, a very good nervous and emotional balance, a sound critical judgment, a readiness for decisions and an instinct for team work. To become a highly professional controller one must be proficient not only in specialized aviation English but also in plain language because aviation safety depends on accurate pilot – controller communications.
4. The training of ATC personnel is carried out by different methods using various teaching aids, systems and simulators. Modern simulators can reproduce the whole ATC task from take-off to landing including all manoeuvres even the dangerous ones.

EXERCISES

1. Ответьте на вопросы:

1. What is the main task of ATC activity?

2. How can controllers expedite the flow of traffic?
3. What aids and systems do controller use to control air traffic?
4. Can any aids or systems substitute a human controller? If not, then why?
5. What are the working conditions of controllers?
6. How many aircraft may controllers control at peak traffic periods?
7. What is one of the vital requirements for ATC controllers?
8. How often do they undergo medical examinations?
9. What qualities should a person possess to become a controller?
10. What can you say about the role of the English language in controller's work?
11. How are controllers trained?
12. Can modern simulators reproduce conflicting and emergency situations?

2. Переведите слова, обращая внимание на словообразовательные элементы:

carry – carrier – carriage
 decide – decision – decisive
 depend – dependent –
 dependence – independent
 differ – different – indifferent –
 differently
 efficient – efficiently –
 efficiency
 exact – exactly – exactness
 introduce – introduction –
 introductory
 necessary – unnecessary –
 necessity
 order – orderly

perform – performance
 power – powerful – powerless
 prevent – prevention –
 preventive
 provide – provision – provider –
 provisional
 reduce – reduction
 responsible – responsibility –
 response – respond
 simulate – simulator –
 simulation
 strict – strictly – strictness
 train – trainer – trainee –
 training

3. Переведите на английский язык:

1. Существует много технических средств, помогающих диспетчерам в их работе.
2. Главным элементом в системе УВД является диспетчер, т.к. он принимает окончательное решение в любой ситуации.

3. Так как работа диспетчера очень ответственна, необходим строгий отбор и подготовка персонала УВД.
 4. Диспетчер должен иметь хорошее физическое здоровье, умение принимать решение и работать в команде.
 5. Различные тренировочные средства, системы и специальные тренажеры используются для подготовки персонала УВД.
 6. Современные тренажеры позволяют имитировать все этапы полета, включая аварийные ситуации.
 7. 15 или даже больше самолетов находятся под контролем диспетчера в период интенсивного движения.
 8. Электронные средства не могут заменить диспетчера. Они могут только помогать ему.
 9. Диспетчер не должен допускать ошибок, так как это может привести к потере человеческих жизней.
 10. Минимумы эшелонирования будут уменьшены в ближайшем будущем.
 11. Какой европейский центр подготавливает диспетчерский персонал?
 12. Этот тренажер не может воспроизводить аварийные ситуации.
- 4. Распределите следующие слова по их принадлежности к соответствующей части речи, выделите словообразующие приставки и суффиксы на примере таблицы ниже.**

harmful, movement, waterless, attraction, shortage, slowly, enclose, displace, keeper, passage, difference, industrial, assistant, freedom, ability, measurable, popularity, freedom, beginner, buyer, shortage, wisdom, conductor, specific, beautiful, reality, active, famous, classify, starter, shorten, weightless, flatness, simplify, impossible, reconstruct, helpful, misunderstand, poisonous, evidently, disagree, encourage, fashionable, extraordinary, unluckily, logical, significant, unhappy, logistic, organize, pressure, extremely, lengthen, demonstration, destruction, powerless, brotherhood, partnership, overcook, disorder, prehistoric, childish

Part of Speech	Term
Noun	movement
Verb	enclose

Adjective	harmful
Adverb	slowly

5. Образуйте от данных глаголов существительные с помощью суффикса *-er* или *-or*. Переведите на русский язык:

To lead, to write, to read, to visit, to speak, to sleep, to act, to direct, to conduct, to drive, to fight, to mine, to report, to sing, to skate, to swim, to teach, to travel, to sail, to invent, to found, to compose.

6. а) Найдите в каждом ряду существительное.

1. a) developing, b) development, c) developed, d) develop
2. a) provide, b) providing, c) provision, d) provided
3. a) attend, b) attention, c) attentive, d) attending
4. a) knowledge, b) smaller, c) know, d) knows
5. a) better, b) keep, c) keeper, d) kept
6. a) finder, b) finding, c) finds, d) harder
7. a) build, b) better, c) built, d) builder
8. a) behaviour, b) therefore, c) until, d) think
9. a) possible, b) other, c) throw, d) influence
10. a) quite, b) way, c) equip, d) later

б) Найдите в каждом ряду прилагательное.

1. a) probably, b) property, c) probable, d) properly
2. a) suddenly, b) different, c) degree, d) during
3. a) excellent, b) member, c) enough, d) explanation
4. a) dangerous, b) danger, c) determine, d) discovery
5. a) changes, b) consideration, c) consist, d) changeable
6. a) decision, b) decide, c) decisive, d) divide
7. a) possible, b) probably, c) opportunity, d) provide
8. a) simplicity, b) shake, c) scientific, d) schedule
9. a) production, b) productive, c) produce, d) provision
10. a) attends, b) admission, c) achievement, d) attentive

14. HUMAN FACTORS IN AVIATION

Study vocabulary:

ICAO communication, navigation, surveillance and air traffic management (CNS/ATM) systems concept – Концепция систем связи, навигации, наблюдения и управления воздушным движением (CNS/ATM) ИКАО

The global aviation safety plan (GASP) – Глобальный план обеспечения безопасности полетов (ГПБП)

Air Navigation Commission - Аэронавигационная комиссия

ICAO Council – Совет ИКАО

address - обращать внимание (на что-л.) , задумываться (о чём-л.) , исследовать

aim at – стремиться

anticipate human error – предвидеть человеческий фактор, субъективную ошибку

approve – утверждать, одобрять

aviation community – авиационные специалисты

aviation safety – безопасность гражданской авиации

awareness - осведомлённость, компетентность

convene – созывать, созвать

conviction – убеждение

critical aspect – важный вопрос, аспект

deal with – иметь дело

encouraging developments - позитивные перемены, позитивные изменения

ensure - удостовериться, убедиться

improve safety – усиливать безопасность

negative consequences – неблагоприятные последствия

ongoing implementation – постоянный ввод в действие, внедрение

operational environment – условия эксплуатации

operationally – с

эксплуатационной точки зрения

pursue [pə'sju:] – зд. заниматься (чем-л.)

relevant - значимый;

существенный; важный

respond to – отвечать, реагировать

turning point – поворотный

momentultimate goal – конечная цель

Обратите внимание на перевод термина «вопрос, задача»

challenge **concern** **matter**

introduce **challenges** – поставить вопросы, задачи

safety **concern** – вопрос безопасности

safety **matters** – вопросы безопасности

1. Human factor is a critical aspect of aviation safety that ICAO began to address more than a decade ago.
2. For the first time ICAO convened in a series of global symposia on flight safety and human factors in 1990. From the beginning, when the first event was held in a city known then as Leningrad, there was a conviction that international aviation could make enormous progress in improving safety through the application of human factors knowledge.
The first symposium was a turning point and since then human error remains a significant safety concern.
3. The purpose of the worldwide symposia and 10 regional seminars which were held in the past decade was to increase the awareness of States, industry and organizations in all ICAO regions about the importance of human factors. The ongoing implementation of the ICAO communication, navigation, surveillance and air traffic management (CNS/ATM) systems concept has introduced new challenges, and also new possibilities for human factors. The reason the community must respond to is, of course, to ensure that civil aviation continues to achieve its ultimate goal: the safe and efficient transportation of passengers and goods.
4. The ICAO flight safety and human factors programme is safety-oriented and operationally relevant. Moreover, it is practical since it must deal with real problems in a real world. Through the programme, ICAO has provided the aviation community with the means and tools to anticipate human error and contain its negative consequences in the operational environment. Furthermore, ICAO's efforts are aimed at the system – not the individual.
5. The global aviation safety plan (GASP) was developed by the ICAO **Air Navigation Commission** in 1997. GASP was designed to coordinate and provide a common direction to the efforts of States and the aviation industry to the extent possible in safety matters. Therefore the flight safety and human factors programme is among the six major activities that comprise the plan.

EXERCISES

1. Ответьте на вопросы:

1. When did ICAO begin to address to the aspect of human factors?
2. When and where was the first symposium on flight safety held?
3. What can improve aviation safety?
4. How many symposia on flight safety were held by ICAO?
5. What was the purpose of the symposia and seminars?
6. Where can the knowledge of human factors be applied?
7. What is the ultimate goal of civil aviation?
8. What is the ICAO flight safety and human factors programme?
9. What was the global aviation safety plan developed for?
10. Why is the flight safety and human factors programme so important?

2. Переведите слова, обращая внимание на словообразующие элементы:

communicate – communication – communicative – communicable – communicator

efficient – efficiency – inefficient – efficiently – inefficiency

improve – improvement – improvable – improver

industry – industrial – industrious - industrialist – industrialization

navigate – navigation – navigator – navigable – navigability

operate – operation – operative – operator – operational - operationally

organize - organization – organizer - disorganization

progress – progressive – progression – progressionist

safe – safety – safely – unsafe

3. Найдите в тексте английские эквиваленты следующих слов и словосочетаний:

безопасность полетов; человеческий фактор; добиться огромного прогресса; повышение безопасности полетов; человеческий фактор; поворотный пункт; решить ряд проблем; серьезная проблема безопасности; повысить осведомленность; важность человеческого фактора; внедрение концепции систем связи, навигации, обзора и управления воздушным пространством и воздушным движением; комиссия ИКАО по воздушной навигации; вопросы безопасности; новые возможности для учета

человеческого фактора; безопасная и эффективная перевозка пассажиров и грузов; реальные проблемы в реальном мире; предупреждение человеческой ошибки; устанавливать приоритеты, уделять особое внимание; основные виды деятельности

4. Переведите на английский язык:

1. Человеческий фактор является одним из важнейших аспектов авиационной безопасности.
2. В течение последнего десятилетия ИКАО провела несколько симпозиумов и семинаров, связанных с человеческим фактором в авиации.
3. Знание человеческого фактора может значительно повысить безопасность полетов.
4. Для повышения безопасности новые системы связи, навигации и обзора постоянно широко внедряются.
5. Совершенствование управления воздушным движением будет продолжаться.
6. Программа по безопасности полетов и человеческому фактору является инструментом, который позволяет предупреждать человеческие ошибки при выполнении полетов.
7. Вопросы безопасности в авиации и человеческий фактор являются самыми важными в плане авиационной безопасности в мировом масштабе.

5. Прочитайте и переведите на русский язык следующие словосочетания.

the density of the atmosphere	to stay at home
besides you and me	to increase the cost
a new feature of this aircraft	particularly bad weather
to be no longer significant	to move forward
to walk across the street	to gain in speed
to need little space for taking-off	to lose speed
to combine work and studies	bulky cargoes
at a distance of nearly two miles	to lose time
to observe weather changes	to move very fast

on the upper shelf	low clouds
to fit extra seats	a strong water flow
to convert work into energy	a huge cargo
a skilled worker available extra parts	this fact alone
densely-populated countries	to stay at home

6. Найдите в правой колонке слова, противоположные по значению словам в левой.

1. complicated	a) expensive, b) simple, c) similar, d) numerous
2. to remain	a) to lend, b) to leave, c) to measure, d) to stretch
3. to destroy	a) to drag, b) to pave, c) to restore, d) to step
4. huge	a) small, b) strong, c) free, d) hard
5. shallow	a) wide, b) possible, c) important, d) deep
6. gradually	a) also, b) at once, c) chiefly, d) rather
7. repair	a) pay, b) remark, c) surface, d) damage
8. the same	a) due, b) total, c) different, d) essential
9. wide	a) powerful, b) narrow, c) dry, d) necessary
10. strength	a) combustion, b) device, c) weakness, d) force

15. AEROFLOT

Study vocabulary:

cargo aircraft – грузовой ЛА

ICAO framework – в рамках ИКАО

to be considered to – считаться

to be founded – быть основанным

to master - осваивать

to put into service – вводить в эксплуатацию

1. Aeroflot **was founded** in 1923. Its history began with the first flight between Moscow and Nizhniy Novgorod. The 9th of February **is considered to** be its birthday. Our country did not have any planes of its own. We flew by planes bought from Germany. We had to buy and fly on foreign planes.

2. Aeroflot began to fly on Russian-made planes in 1935. By 1941, before the war, we had many airports, large aviation plants, flying schools, colleges and institutes. Aeroflot has done much in the war time for our victory. After the war Aeroflot developed rapidly and successfully. One of the first jet passenger aircraft **was put** in 1956, it was TU-104. Then the new jet aircraft TU-134, TU-154, IL-62 were designed and built.
3. Aeroflot has become one of the largest companies in the world. Its routes were serviced by reliable passenger and **cargo aircraft** including jets of the second generation. In 1970 our country became a member of ICAO – International Civil Aviation Organization, which was established in Chicago in 1944. Cooperation with air companies of other countries within the ICAO **framework** enabled Aeroflot to introduce the most advanced methods of operation. This cooperation was fruitful in the joint programmed on designing, budding and introducing new planes, as well as in the training of flying and technical personnel.
4. Aeroflot traffic has become particularly heavy to our neighboring countries. Our country has supplied many countries with our aircraft, aircraft technology and helped them **to master** new types of aircraft. A modern training center for flight and ground personnel was opened in our country. It has helped to train a great number of civil aviation specialists for many countries. Many routes have been initiated and many flights have been introduced.
5. Aeroflot has seen intensive expansion in civil aviation international operations. Many communications agreements have been concluded between our country and other countries. New types of aircraft have been designed and built.
6. There are new designs such as TU-204, IL-96 and some other designs. Aeroflot has also bought some Western-built airliners – A-310, Boeings. They can offer new levels of comfort and service on our domestic and international routes.

EXERCISES

1. Ответьте на вопросы:

1. When was Aeroflot founded?
2. What did its history begin with?

3. When did Aeroflot begin to fly on Russian-made planes?
4. When did our country become a member of ICAO?
5. What has our country supplied many countries with?

2. Переведите следующие предложения на русский язык, обращая внимание на условные придаточные предложения.

1. If I come home early, I'll be able to write my report today.
2. If he were at the Institute now, he would help us to translate the article.
3. You will get good results if you apply this method of calculation.
4. If he had taken a taxi, he would have come on time.
5. If the speed of the body were 16 km per second, it would leave the solar system.
6. If it had not been so cold, I would have gone to the country.
7. If the air were composed only of nitrogen, burning would be impossible.
8. If you press the button, the device will start working.

3. Проанализируйте следующие предложения и скажите, какие значения они выражают (возможные действия в будущем, нереальные действия в настоящем и будущем).

- A.
1. If you find the exact meaning of this word, you will understand the sentence.
 2. If he works hard at his English he will pass his exam well.
 3. If I get a good dictionary, I shall translate this text.
 4. If you go to a library, you will find there all the books you need.
 5. If the student observes the rules, he will not make mistakes.
 6. If you help me, I shall repair the engine in an hour.
 7. If they receive all the necessary equipment, they will be able to carry out their experiment.
 8. If they change some details, they will be able to improve the design.
- Б.
1. If you traveled by plane, you'd come in time for the conference.
 2. If I took a taxi I would catch the last train.
 3. If the builders hadn't worked overtime, the canal wouldn't have been opened in time.
 4. If the satellite's speed were less than required, it would drop and enter the atmosphere.

5. If the students had been more careful, they wouldn't have broken the new apparatus.
6. If the driver had been more careful, the accident would not have happened.
7. If I were you, I wouldn't worry about it.
8. If you knew the design of the motor, you would be able to operate it properly.

4. Измените следующие предложения по образцу, приведенному ниже, и переведите их на русский язык.

ОБРАЗЕЦ: a) If I were in your place, I would do this work myself.

Were I in your place, I would do this work myself.

б) If he had known the subject better, he wouldn't have failed in his exam.

Had he known the subject better, he wouldn't have failed in his exam.

1. If it were necessary to increase the speed of this particular engine, it could be achieved by using a special device.
2. If the road had been better, we would have been here in due time.
3. If the engineer had been informed of the results before, he would have allowed you to repeat the test.
4. If we had used new methods, we would have saved a lot of time.
5. If the oil supply had stopped even for a moment, serious damage might have resulted.
6. If the mechanic were there, he would repair the equipment.
7. If the air within the cylinder were motionless, only a small proportion of the fuel would find enough oxygen.
8. If the books on that subject were available in our library, I would be able to make a good report.

5. Найдите и выделите суффиксы в данных словах и определите, к какой части речи эти слова относятся:

British, understandable, heartless, pitiless, successful, experiment, function, musician, socialist, artist, capitalism, professional, fundamental, industrial, doubtful, useful, different, treatment, creative, attractive, peaceful, dangerous, elementary, childish, active, economic, director, worker, passage, marriage, silence, freedom, kingdom.

16. SPACE EXPLORATION/Исследование космоса

Study vocabulary:

before long — скоро, вскоре

conquering space — освоение космоса

crew transferring — переход экипажа

docking — стыковка

instrument-carrying spacecraft — космический аппарат с

man-made /artificial/ satellites — искусственные спутники

manned spacecraft — космический аппарат с человеком на борту

mutual cooperation — взаимное сотрудничество

outstanding achievement - выдающийся успех

pave the way - проложить путь

scores and scores - десятки и десятки

to result in launching — привести к запуску

to set foot upon the moon — высадиться на луну

unfavourable consequences — неблагоприятные последствия

unmanned spacecraft — управляемый (с земли) космический корабль
приборным оборудованием

SOME STEPS IN CONQUERING SPACE

1. For hundreds of years people have been dreaming of cosmic flights. Yet the dream remained only a dream till 1957 when Soviet people sent up the first man-made satellites. The space age began on October 4, 1957, when the Soviet Union placed Sputnik I into orbit as the Earth's first artificial satellite. On January 31, 1958, the United States entered space with its first artificial satellite, Explorer I. Since then scores and scores of instrument-carrying spacecrafts have been fired spinning around the Earth and racing deep into the Solar system.
2. Some unmanned spacecrafts have been sent to the Moon and planets. In 1959, for example, the Soviet Luna I travelled around the Moon, took pictures of the side never before seen by man, and then transmitted those pictures back to the Earth.
3. On April 12, 1961 a Soviet citizen, Major Yuri Gagarin became the first man to orbit the Earth. In his Vostok spaceship Gagarin made only one turn around the Earth but the success of his flight and the absence of any unfavourable consequences paved the way for the next manned flights. Four months later, on August 6, Major Titov orbited the Earth 17 times in the Vostok 2 spacecraft.

4. An outstanding achievement in the Russian space program occurred in 1965 with the dramatic flight of Voskhod 2 in which the cosmonaut Alexei Leonov emerged from the craft into outer space to perform the first human experiments in space.
5. Numerous manned space flights round the Earth signified the beginning of a new stage in man's study of the Universe. They showed that before long men would land on planets of the Solar System. On July 20, 1969 two American astronauts of the three-men Apollo spacecraft became the first human beings to set foot upon our nearest planetary neighbour, the Moon. Neil Armstrong and Edwin Aldrin descended on to the Moon on the Eagle landing module. They took numerous photographs, carried out scientific experiments and left a plaque, summarizing their historic mission by the inscription: "...We came in peace for all mankind".
6. The space station era opened in 1971 with the launch of the Soviet Salyut-I and Mir stations. Mutual cooperation of Russia and America in manned space flight resulted in launching Soyuz and Apollo, their successful docking in the orbit and crew transferring from one vehicle to the other. American Shuttle Program and the Soviet Space Shuttle Buran opened up a qualitatively new stage in space research.
7. In conclusion it should be noted that both manned and unmanned space flights performed during the space age as well as scientific, technological and medical experiments connected with them are of great significance for exploration of our world, the Solar System and the Universe.

EXERCISES

1. Ответьте на вопросы

1. When did the people's dream of cosmic flights stop to be a dream?
2. What happened in October 1957?
3. What was the name of the first American satellite and when was it fired into orbit?
4. How did Russian scientists begin to research the Moon?
5. What do you know about the first astronaut to orbit the Earth?
6. What mission did A. Leonov, a Russian cosmonaut, perform?
8. When and how did Americans investigate the Moon?
9. What did they leave on the Moon?
10. How did mutual cooperation of Russia and America take place?
11. What is the role of manned and unmanned flights for the exploration of

the Universe?

2. Найдите в тексте английские эквиваленты следующих слов с словосочетаний.

Освоение космоса; оставаться мечтой; искусственные спутники; вывести на орбиту; запустить искусственный спутник, чтобы вращаться вокруг Земли, управляемый с Земли космический аппарат; фотографировать; делать только один оборот вокруг Земли; неблагоприятные последствия; прокладывать путь; выдающееся достижение; чтобы выйти из корабля в космическое пространство; для проведения экспериментов в космосе; множество пилотируемых космических полетов; вскоре; космический корабль с экипажем из трех человек; высадиться на Луну на посадочном модуле; для проведения научных экспериментов; взаимное сотрудничество; привести к запуску космических кораблей; успешная стыковка на орбите; переход экипажа с одного корабля на другой; в заключение следует отметить; космические исследования; а также; иметь большое значение.

3. Переведите слова, обращая внимание на словообразующие элементы:

to conduct — conductor, semiconductor, conduction, conductivity

to conquer — conquest, conqueror, conquerable, conquering

to convert — converter, conversion, convertible, inconvertible, convertibility

to discover — discovery, discoverer, discovered, discovering

to expand — expansion, expanded, expanse, expansive, expansibility

to explore — explorer, exploration, exploratory = explorative, exploring

to investigate — investigator, investigation, investigative = investigatory

to know — knowledge, known, unknown, knowing, knowledgeable, knowingly, know-how, know-nothing

to launch — launcher, launching, launched

to perform — performance, performer, performed, performing

to produce — producer, production, productive, productivity, producible, to reproduce, reproduction

to radiate — radiation, radioactive, radioactivity, radiology, radium

to react — reaction, reactor, reactive, reactivity, reactionist, reactionary

to signify — significance, significant, insignificant, signification

to transmit — transmitter, transmission, transmissible, intransmissible

4. Переведите следующие «цепочки существительных». Запомните, что переводить ряд существительных, не связанных предлогами, следует, как правило, с конца.

Power consumption; power consumption change; signals manipulation; transistor invention; circuit functions; circuit application; circuit components; communication systems; data processing systems; integrated circuits development; science field; process control; automatization processes control; circuit components; size reduction; electronics development; communication means; problem solution; space exploration; air traffic control; transmission line; long-distance power transmission; electricity discharge; energy distribution; electromotive force generation; an induction coil; internal combustion engine.

5.Образуйте глаголы с отрицательным значением, используя префиксы *-mis*, *-dis*. Переведите полученные слова на русский язык.

to understand, to approve, to appear, to satisfy, to lead, to connect, to organize, to obey, to behave, to appoint, to associate, to prove, to take.

6. Подберите к терминам, данным в левой колонке, определения, представленные справа.

Term	Definition
1. Vehicle	a. a moon revolving around a larger planet.
2. Satellite	b. the world; the totality of all the things that exist.
3. Fission	c. joining up with another vehicle in outer space.
4. Emission	d. a splitting; division into parts.
5. Docking	e. the ejection of electrons from a surface by heat, radiation, etc.
6. Universe	f. any device for carrying persons or objects over land or in space.
7. Nucleus	g. the first American artificial satellite.
8. Vostok	h. the landing module on which two Americans descended on to the Moon.
9. Eagle	i. the spaceship launched with the first man to orbit the earth.
10. Explorer	j. the central part of an atom, constituting almost all of the mass of an atom.

17. THE ROLE OF RUSSIAN SCIENTISTS IN EXPLORATION OF SPACE/Роль русских ученых в исследовании космоса

Выполните перевод текстов.

Since Galileo invented the telescope and directed it at the Moon and other planets in the 16-th century, scientists have been learning the secrets of the Universe. Many Russian scientists, engineers and inventors have contributed greatly to the development of space flights and rocketry since the first "Rocket Institution" was established in Moscow by the order of Peter the Great.

A.D. Zasyadko, a talented Russian scientist and celebrated military leader, began working on various types of combat rockets in 1814. His rockets had a maximum range of 2,670 m and were successfully used against enemy cavalry in the Caucasus in 1825. Zasyadko conducted warfare under Suvorov's command in 1799, took part in the Patriotic War of 1812 and was awarded six medals for his bravery.

Thanks to the scientific work of K.I. Konstantinov Russia became the leading country in rocket artillery in the 19-th century. The scientist developed an electric ballistic device.

N.I. Kibalchich was the first man in Russia who worked out the design of rocket-propelled vehicle (космический корабль с реактивным двигателем). His device was propelled by a rocket engine burning powder. Kibalchich described the operating principles of a powder rocket engine and showed the possibility of controlling the vehicle and ensuring its stability.

Many other talented scientists influenced the development of space vehicles and rocketry in Russia but it was the great Russian self-taught scientist K.E. Tsiolkovsky, who became the founder of astronautics, the scientific study of space travel.

The main problem, Tsiolkovsky had been working at for many years, was creating a theory of interplanetary travel. He laid the foundation of all subsequent rocket theories, proved that the rocket was the very ship on which the man will be able to leave the Earth penetrating into boundless spaces. He outlined his design of the first jet-driven flying machine*. It was Tsiolkovsky who suggested the idea of a multistage rocket and of man-made satellite which could serve as a laboratory for studying the Universe. Tsiolkovsky succeeded in producing a workable design for a liquid-cooled rocket combustion chamber**.

And the first man-made satellite was taken into the skies by a type of a rocket designed by Tsiolkovsky 50 years ago. Moreover, the orbit along which the satellite sped had been also calculated by him.

The name of the outstanding Russian scientist S. P. Korolyov will forever

be linked with the era of man's exploration of space.

He was fond of Tsiolkovsky's ideas and practically solved three main problems: the problem of gravitation, the problem of weightlessness and the problem of reentry. The first problem was overcome with the launching of the first artificial satellite. Scientists were studying weightlessness, when they fired a vehicle with dog Laika on board. On safe landing of dogs Belka and Strelka on August 19, 1960, the problem of reentry was solved. Since that time hundreds of space shots have been made from Baikonur under the guidance of Korolyov which benefited Russian science and national economy.

** a liquid-cooled rocket combustion chamber — камера сгорания ракеты с жидкостным охлаждением

N.I. Kibalchich —народоволец Николай Иванович Кибальчич (1853—1881)

Изобретатель, автор первого в России проекта ракетного летательного аппарата для полёта человека. Идея была предложена за 22 года до публикации К.Э. Циолковским его первой работы «Исследование мировых пространств реактивными снарядами» и за 80 лет до первого полета человека в космос.

PROPULSION IN SPACE

It is well known that the only means of propulsion in outer space is some type of rocket. As stated in Newton's laws of motion, one mass can be accelerated only by having a force push between* it and another mass. In space the second mass must be carried aboard the vehicle. This is the fundamental principle of rocketry.

There are some basic types of power plants. Some of them have been used for many years and have been perfected. Others are rather new achievements. In the first type, the propellant gas is accelerated by heat energy generated by chemical reactions. This is the most fully developed system and is the one used in many rockets fired at present. Another type involves acceleration of a gas by heat energy from nuclear reactors, electric arcs or the sun. In this system the large power plant weight is a certain difficulty that can be compensated only by higher exhaust velocities**, the achievable velocity is limited only by the heat resistance of the structural materials.

One more propulsion system is an electrical operation in which the propellant can be converted to ions accelerated by electric fields, or by combined electric and magnetic effects. Much higher exhaust velocities can be reached by electrical acceleration. There is one more system based on the emission of photons producing thrust.

Notes:

* by having a force push between — за счет силового толчка, возникающего

между

** exhaust velocity — скорость истечения

ATOMIC POWER FOR SPACE TRAVEL

Many scientists of today believe that nuclear engines are the best as propulsion for the spaceships that make extremely long voyages through the interplanetary space.

Atomic engines are relatively light in weight and can deliver power for years without running out of fuel. Up to now thermal power has been used to drive rocket engines. This power is obtained by burning oxygen and hydrogen. In both, the chemical and the nuclear rocket engines it is the heat energy that expands the hydrogen gas and causes it to escape through the nozzle at high speed. In the first case it is the heat of the chemical burning of hydrogen and oxygen; in the second — the heat from the fissioning or splitting of atoms inside the reactor. In the atomic engine designed for providing a large thrust, heat is generated by carefully controlled atomic fission in a reactor.

This heat is used to heat hydrogen, which then thrusts out of the exhaust nozzle at a great speed to push the rocket. Tremendous power is needed to drive a rocket or spaceship beyond the forces of the Earth's gravity. But when the ship is already deep in space, much smaller power supplies are necessary to propel the ship. Atomic power can provide both these propulsion requirements. It makes great contribution to space research.

Notes: * exhaust nozzle — выхлопное сопло

TEST

1. Вставьте необходимые слова вместо пропусков.

- American astronauts descended on to the Moon in the _____ landing module.
a) Apollo b) Eagle; c) Explorer d) Discovery
- We know that the design of the first rocket-propelled vehicle was worked out by _____.
a) Konstantinov b) Kibalchich; c) Korolyov d) Tsiolkovsky.
- Nuclear power has many _____ for its application in satellites and spaceships.
a) admissions; b) adoptions c) advantages; d) accomodation
- The first walk into outer space was performed by the Russian cosmonaut from the _____ spaceship.

- a) Voskhod; b) Vostok; c) Soyuz; d) Molnia
5. Since _____ invented the telescope and directed it at the Moon and other planets in the 16-th century, scientists have been learning the secrets of the Universe.
- a) Konstantinov b) Kibalchich; c) Galileo d) Tsiolkovsky
6. _____ developed an electric ballistic device.
- a) Konstantinov b) Kibalchich; c) Korolyov d) Tsiolkovsky
7. _____ described the operating principles of a powder rocket engine and showed the possibility of controlling the vehicle and ensuring its stability.
- a) Tsiolkovsky b) Kibalchich; c) Korolyov d) Konstantinov
8. Who became the founder of astronautics, the scientific study of space travel?
- a) Konstantinov b) Kibalchich; c) Galileo d) Tsiolkovsky

GRAMMAR REFERENCE

1. Модальные глаголы

1. **Переведите предложения, обращая внимание на употребление модальных глаголов и их эквивалентов.**
 1. An alternating current *can* be transformed to a direct current form for practical application.
 2. In order to apply and control the effects that *can* be produced by the flow of electricity, engineers *must* control the current that is they *have to* know its laws.
 3. A magnetic field *may* be represented by means of magnetic lines of force.
 4. M. Faraday *had to* make a lot of experiments before he *could* come to the discovery of electromagnetic induction.
 5. Hans Christian Oersted *was able to* prove the existence of magnetic field around a current.
 6. That part of the motor *should* be repaired.
 7. Electrical engineers *were allowed* to test the new equipment.
 8. An electric current will *be able to* flow only when an electromotive force is established in a circuit.
 9. — *Must* we go and bring Pete from the hospital now? — No, you needn't. Pete is still ill and he *will be allowed* to leave the hospital only in a week.
 10. If you are so forgetful you *ought to* write down all the telephone messages.
2. **Измените предложения (А) и дайте ответы на следующие вопросы (В) по образцу.**
 - А. *I can't do it now; (tomorrow).*
I'll be able to do it tomorrow.
 1. Mike can't come to see you today; (on Sunday).
 2. I can't ring you up at 3; (in the evening).
 3. Nick can't leave the hospital tonight; (in a week).
 4. I can't speak English fluently now; (I hope, ... in a year).
 5. They can't discuss the problem today; (tomorrow).
 6. They can't buy a new car now; (next year).
 7. Kate is busy and can't go shopping now; (in the evening).

- B.** — *Did you have to do it yesterday? (A — last week; B — next week).*
— *No, I didn't. A — I had to do it last week.*
B — I'll have to do it next week.

1. Did they have to put the new electric station into operation on Friday?
(A — last month; B — next month).
2. Did the engineer have to solve the problem yesterday?
(A — the day before yesterday; B — the day after tomorrow).
3. Did mother have to cook dinner at three?
(A — at two; B — at five).
4. Did you have to translate the article for today?
(A — for yesterday; B — for the next lesson).
5. Did you have to make the experiment an hour ago?
(A — in the morning; B — after dinner).
6. Did they have to measure the current in the circuit?
(during their lab. work).
7. Did the students have to take their exam in the morning?
(A — last night; B — at three o'clock).

- C.** *May I go out? — Yes, you may. No, you mustn't.*
Must I go there? — Yes, you must. No, you needn't.
Can you speak English? — Yes, I can. No I can't.

1. Can electric pulses move at the speed of light? Yes,
2. May I take your book? No, I need it myself.
3. Can you explain that electric phenomenon? No,
4. Must he know all the laws of electricity to measure the resistance in the conductor? No,.... He must know Ohm's law.
5. Can computers replace people in their routine work? Yes,
6. Must we make the experiment at once? No, You may do it later.
7. May we take part in the preparation to that experiment? No, You are not ready for this work yet.

4. Раскройте скобки и поставьте модальный глагол в предложенном времени.

1. Scientists (сумели) to discover a number of free electrons in a material.
2. Engineers (должны были) measure the resistance in a conductor.

3. It (следует) be noted, that Ohm's law is of great importance in physics because it (может) be applied to many electrical phenomena.
4. Due to Ohm's law we (сумеем) define the force of current.
5. According to Ohm's law, resistance (должно) be equal to the potential difference divided by current.
6. He (разрешили) take part in that important experiment.
2. Coulomb, the famous French scientist, (смог) establish the law about static charges.
3. Devices connected in series (должны будут) operate at the same time.
4. That phenomenon (следует) be investigated.
5. You (нет нужды) come to school so early.
6. You (можешь) come 10 minutes before the lessons begin.

2. Местоимения *it, one*.

Запомните словосочетания, передающие безличностную форму выражения, характерную для научно-технических текстов.

It is (well) known — (хорошо) известно

It is noted that — отмечают, что

It should be noticed — следует отметить

It should be pointed out — следует указать

It is important to note — важно отметить

It is interesting to note — интересно заметить

It is of interest to compare — интересно сравнить

It is believed / it is expected / it is supposed — полагают

It's quite possible — вполне вероятно, что

It appears — оказывается

It is necessary to describe — необходимо описать

It is clear (from Fig. 1) that — из рис. 1 ясно, что

In this event it is indicated — в этой связи указывается

It is seen from Fig. 1 — из рис. 1 видно

1. Переведите предложения, обращая внимание на безличностную форму их выражения.

- A) 1. It is well known that one form of energy can be converted into another form.
2. It is difficult to imagine now how people could do without electricity.
3. It is necessary to remember the term "circuit", as it is impossible to work with electricity without circuits.

4. It is interesting to note that Russian scientists made great contribution into the development of electrical engineering.
5. It is known that high voltage means low current, low current in its turn results in reduced heating losses in electrical wires.
6. It is hard to imagine how we could calculate without using electronic calculating machines.
7. It is dangerous to come into contact with high voltage.

- B) 1. It is the ampere that is the unit of current.
2. It was Lomonosov who stated that heat phenomena were due to molecular motion.
 3. It is the difference of potential that causes the free electrons to flow from one point of the conductor to another.
 4. It is the sun that is an unlimited source of almost all kinds of energy.
 5. It was Ampere who showed the difference between the current and the static charges.
 6. It was thanks to Lomonosov that Moscow University was founded in 1755.
 7. It was Academician Yoffe who predicted the future use of semiconductors.

- C) 1. One must remember that it is necessary to study English at least an hour a day.
2. One understands the importance of electricity when one sees trams, trolley-buses and trains driven by it.
 3. One must know the chemical properties of the atom.
 4. One can charge dissimilar objects by rubbing them.
 5. One should remember that the electric power can burn and kill, but it will serve us well if we use it wisely.
 6. When the current is small, one should use a galvanometer.
 7. One can reduce heat losses in transmission lines.

3. Причастие.

Прочитайте и переведите словосочетания, содержащие:

A. Причастие I (Participle I).

The science *dealing* with electronic circuits; devices *calculating* the spaceships trajectories; the Greek word 'electrum' *meaning* amber; the device *protecting* buildings from lightning; electrons *moving* through the metal; current *flowing* through the circuit; current *changing* its direction; laboratories *requiring* the DC; glasses *improving* the telescope; the scientist

enjoying the world-wide popularity; the motor *operating* on the principle of electromagnetic induction; generators *converting* mechanical energy into electrical power; *the starting* point; the *working* operators; the *moving* electrons.

Б. Причастие II (Participle II).

The devices *used* in scientific research; information *received* by an operator; the transistor *invented* in America; vacuum tubes *replaced* by transistors; a lot of components *made* all at a time; the force *known* as electricity; the lightning conductor *invented* by B. Franklin; charges *conducted* to the earth; components *assembled* on a chip.

Applied physics; transmitted information; *decreased* voltage; *reduced* weight; *increased* reliability; *created* electronic circuits; *charged* objects; the *improved* electric arc; *closed* circuits; *generated* and *received* energy; the *designed* transistors; *lowered* manufacturing costs; *realized* aims.

С. Причастие. Независимый причастный оборот

1. The professor told the students about the experiments being carried out in the laboratory.
2. Having looked through all the documents and letters received that day he called his secretary.
3. Squeezed by the ice the steamer could not continue her way.
4. She showed us a list of the newly published books.
5. Lake Baikal, known to be the deepest in the world, is fed by 336 rivers.
6. The sun having risen, they continued their way.
7. The talks between the two countries were conducted behind the closed doors, measures having been taken that no correspondent should receive any information.
8. The figures mentioned in his report were published in the latest scientific journal.
9. The goods having been loaded, the workers left the port.
10. Having been advised by the doctor to go to the south, she decided to spend her leave in Sochi.
11. One of the most noticeable features of air transport development is the big increase in the quantities of goods carried.
12. Kerosene is the fuel used in jet engines.
13. Driving a car at night he met with an accident.

14. Having refused to unload American ships the French dockers lost their job.
15. Having been taught by a good teacher he knew German well

4. Страдательный залог

1. Прочитайте текст и переведите его, обращая внимание на образование the Present Continuous Passive глаголов.

An Auto Repair Shop

Susan Thompson had a lot of trouble with her car last week, so she decided to take it to Joe's Auto Repair Shop to be fixed. The car is there now and is receiving a lot of attention from Joe and the other mechanics at his shop.

The engine *is being tuned*. The oil *is being changed*. The battery *is being charged*. The brakes (тормоза) *are being adjusted*. The heater (радиатор) *is being repaired*. The broken headlight (фара) *is being replaced*. The hood (капот) *is being repainted*. The tyres (шины) *are being checked*. And the broken rear window *is being fixed*.

Susan is aware that she's probably going to pay a lot of money for these repairs. But she is confident that her car will be returned to her in excellent condition by the fine people who work at Joe's Auto Repair Shop.

2. Раскройте скобки, употребляя глагол в соответствующем времени PASSIVE VOICE. Переведите предложения на русский язык.

1. The plane (to build) next week.
2. The tyres (to check) a week ago.
3. The heater (to repair) now.
4. The brakes (to adjust) in this repair shop every day.
5. The hood (to repaint) by 5 o'clock yesterday.
6. The engine (to tune) yesterday.
7. This work (to do) by 5 o'clock tomorrow.

3. Переведите предложения на английский язык.

1. Самолеты готовят к полету каждую неделю.
2. Шасси заменили вчера.

3. Двигатель осмотрят завтра.
4. Шину заменят завтра к 5 часам..
5. Когда летный состав придет, самолет будет готов к полету.

4. Выберите правильный вариант и переведите предложения на русский язык.

1. Last week the engines (to repair) by Tom.
a. are repaired b. were repaired c. repair
2. Look! The car (to repair).
a. is being repaired b. is been repaired c. has being repaired
3. The brakes (to adjust) tomorrow.
a. will be adjust b. will have adjusted c. will be adjusted
4. This problem (to study) now.
a. have been studied b. is being studied c. are studied
5. The heater (to repair) by the end of September.
a. is repaired b. were repaired c. had been repaired
6. Your luggage (to pack) yesterday.
a. was packed b. will be packed c. was being packed
7. He (to tell) about the meeting two days ago.
a. is being told b. was told c. have been told
8. Many planes (to build) in our town every year.
a. have been built b. are built c. will be built
9. The oil (to change) every month.
a. have changed b. is changed c. is being changed
10. This work (to do) from 5 till 7.
a. were done b. was being done c. will do
11. The broken rear window (fix) last week.
a. is being fixed b. will be fixed c. was fixed

5. Предлоги

1. Переведите предложения, обращая внимание на употребление предлогов.

A. among, between

1. Bus N5 runs between Piccadilly Circus and Trafalgar Square. 2. They like to walk in the forest among the high trees. 3. I can't find my handkerchief among all those things. 4. Let it stay between you and me. 5. He is lying on the grass among beautiful flowers. 6. Who is that boy standing between Fred and Alex? 7. There is a little table between two armchairs.

B. besides, except

1. All the boys are playing football except Tom. He is watching their game. 2. We study many subjects at school besides English. 3. Kate likes all the fruits except bananas. 4. I have two more friends besides Pete. 5. Den trains much in the gym, besides his morning exercises. 6. Besides jazz I enjoy rap and rock. 7. Everybody agrees with me except Mike.

C. beyond

1. You can't enjoy the sea, it's beyond that big hill. 2. I'm doing my best, but to help him is beyond my power. 3. The scenery in some parts of the Caucasus is beautiful beyond description. 4. Children, don't go beyond the garden-gate! 5. His honesty is beyond doubt. 6. I can't help you to get tickets; it's beyond me. 7. The house is a little beyond the bridge.

2. Заполните пропуски необходимыми предлогами.

1. The airplanes start regularly _____ in the case _____ a storm. 2. I can't do it alone; you have to ask somebody else _____ me. 3. The ship makes regular voyages _____ Sochi and Taganrog. 4. He goes _____ school every day _____ Sunday. 5. I can't get what he is talking _____; it's _____ my understanding. 6. Ann failed to see the manager as she came _____ his visiting hours. 7. Kate is fairest _____ the girls _____ our group. Her beauty is _____ doubt. 8. He has no time left _____ work and studies; and he has no experience _____ school training. 9. Don't get frightened, you're _____ friends. 10. The road runs _____ here and there.

3. Переведите предложения. Постарайтесь запомнить употребление предлогов.

To; into

1. Russian and foreign scientists contributed greatly to the development and application of electricity. 2. Listen to the teacher. He says that power at low voltage can be easily changed into power at high voltage due to transformers. 3. As to the motion, it is the relative displacement of a body in space with respect to other bodies. 4. What has happened to him? It seems to me he doesn't pay attention to your words at all. What can you

reply to that? 5. You must always be attentive to what I say to you, sonny. Be polite to everybody and be quick to apologize to people if you're in fault. 6. Turn to the left and go to that building. If you enter it through the front door, you'll get into a large hall. 7. Water turns into steam at 100 degrees of Centigrade. This fact must be taken into account.

From; from ... to

1. Automotive engines convert mechanical energy from fuel into heat and then mechanical work. 2. Engineering thermodynamics deals with changing energy from one form to another. 3. The lightning conductor protected buildings from lightning by conducting electricity to the earth. 4. — I see that you are working too much, from morning till (to) night. What are you doing? — I'm translating some articles from English into Russian and from time to time I'm looking for unknown words in the dictionary. 5. You see I hide this book from children. You may take it from the shelf. Read it from the beginning to the end, it's very interesting from my point of view. 6. The patient suffered from terrible headache. Doctors did their best, but nothing resulted from their efforts. The patient didn't recover from his illness and soon died from cancer. 7. They travelled from London to Sochi. Ships in this harbour are quite safe from storms, from now on this port will receive tourists from all over the world.

Out; out of

1. — Is Kate in? — I think, she is out and I'm afraid, she is away. — Could you find out her new address? 2. — Where is Nick? He is still not well. — Don't worry, dear. He is out of danger now and is playing football out of doors. 3. They worked out a new plan and set out to Sochi on board the boat. We came to see them off and watched their boat till it was out of sight. 4. — You see, I haven't seen them for a long time and their matter was quite out of my mind. — Don't take it close to your heart. Out of sight, out of mind. 5. I can't make out what he is talking about. But to agree with his plan is out of question.

4. Переведите словосочетания, употребляя правильный предлог.

Благодаря; с утра до вечера; по отношению к; время от времени; направо; со всего мира; с моей точки зрения; вне опасности; на дворе; отныне; с начала до конца; что касается; мне кажется; отныне; об этом не может быть и речи.

Преобразовать электричество в тепло; принимать во внимание; обращать внимание на; не быть дома; разрабатывать план; быть внимательным к...; прятать от; проистекать (происходить в результате); скрыться из виду; превращаться в; выяснять; переводить

с... на...; умереть от ч.-т.; слушать к.-т.; понять (разобрать); извиняться перед; отправляться в Москву; быть внимательным со всеми; забыть (выскочить из памяти); страдать от болей; вы очень добры ко мне; с глаз долой, из сердца вон; что случилось с тобой?; способствовать чему-то; повернуть направо; изменить энергию из одной формы в другую; защищать от молнии; взять книгу с полки.

5. Переведите предложения. Постарайтесь запомнить употребление предлогов.

For

1. This work is too difficult for me for the time being. 2. — When does the train start for Liverpool, I wonder? I'm waiting for it for half an hour. — I'm sorry for you, but the train left a few minutes ago. 3. I'm sorry, but I'm not ready for the lesson, for I haven't got a dictionary. You know, I was going to prepare for the test in English and for this purpose I called to Nick to ask for a dictionary, but Nick was out and I couldn't translate the text without a dictionary. 4. — Won't you go for a walk in the park? — You see, I'm not quite well for a time and can't go out for fear of catching cold. I've sent for the doctor and now I'm waiting for him. 5. He has worked at the plant for many years and got a good salary for his job. That plant is famous for its high class machines. 6. — Is it necessary for us to leave? — Yes, for sure. I'm afraid, we'll be late for dinner. Let's start for home soon. — It's for you to decide. As for me, I have no objection. I'm thankful for all the pleasant time I've had here. 7. He went for a tour around the country for two weeks, for he was going to leave that country for Canada forever.

About

1. What are you thinking about, I wonder? Don't you hear me? I'm talking to you for about ten minutes. 2. — Have you got your watch about you? Could you tell me what the time is now? — Certainly, it's about 3 o'clock. Father will come back in about 5 minutes. 3. There were about ten children in the garden. We watched them running about. 4. — I'm hungry, what about dinner? — As far as I know, dinner is about 5 o'clock here. But as for me, I'm not hungry and I don't care about it. 5. Don't leave paper about when you go for a picnic.

By

1. It's well known that the novel "War and Peace" was written by L. Tolstoi. 2. He took me by the hand and asked me by what train I had come. I recognized him by his voice. 3. — What is your father by profession, by the way? — He is a businessman and often goes on business by train or by plane. As far as I know, he prefers travelling by day rather than by night

and likes to send letters by special messengers, not by post. 4. — What do you mean by that? — I mean that I met him by accident and hardly recognized him because I knew him only by name and had never seen him before. 5. I'm sorry, I didn't learn the poem by heart because I took the wrong book by mistake. 6. — Did you come by land or by sea — By no means. We came on foot and the rain caught us by surprise. 7. Come in one by one and tell me everything step by step.

With, without

1. Our teacher is very popular with the pupils and they always listen to him with great interest. 2. — Leave your message with the secretary without hesitation and come along with me. — With pleasure. 3. — Why are you angry with me? — I'm not satisfied with your work and I am not pleased with your papers written with this fountain-pen. I'm red with anger. 4. Have you got money with you? What have you bought with the money I gave you yesterday, I wonder? 5. She spoke English without any mistakes with a slight accent. 6. — you can't do that without my permission. — OK, mum, it goes without saying. 7. There is no smoke without fire.

Within

1. I live within a mile from here. 2. He was not within hearing and it wasn't within my power to get him on the phone. 3. — Look, the yard is covered with snow. — Don't worry, I'll clean it from snow within two hours. 4. She promised to give me an answer within a week. 5. The building should be beautiful within and without. By the way, this door opens from within.

6. Подберите английские эквиваленты следующим фразам. Постарайтесь употребить правильный предлог.

В настоящее время; как насчет ужина; в течение некоторого времени; с этой целью; из-за боязни; около 7 часов утра; что касается меня; наверняка; идти гулять; иметь с собой; ожидать к.-н. в течение часа; думать о детях; быть готовым к уроку; уезжать в Москву на месяц; отправляться в Лондон; готовиться к уроку; послать за доктором; опаздывать к обеду; славиться (быть известным) ч.-н.; мне все равно.

Нет дыма без огня; пользоваться популярностью; слушать с интересом; писать карандашом; иметь при себе деньги; прибыть морем; лететь самолетом; взять за руку; без разрешения; говорить с акцентом; ни в коем случае; с удовольствием; в пределах слышимости; не в моей власти; по ошибке; неожиданно; случайно; между прочим;

купить на деньги; ночью; днем; шаг за шагом; без ошибок; по профессии; узнать по голосу; послать по почте; внутри и снаружи; ехать поездом.

6. Совершенное продолженное время

1. Проанализируйте и переведите предложения, обращая внимание на употребление Perfect Continuous Tenses.

1. For hundreds of years people have been dreaming of cosmic flights. 2. It had been snowing for an hour when I started to drive home. 3. I had been driving for 20 minutes before the accident happened. 4. How long will the spacecraft have been flying when it reaches the space station? It will have been flying for two weeks. 5. How long had you been studying English before you entered the University? 6. Many people have been taking the bus every day for many years. 7. That man has been standing at the bus stop, and has been waiting for the bus for fifteen minutes. 8. How long will your Granny have been working before she retires? She will have been working for about 30 years. 9. How long have they been broadcasting this news? They have been broadcasting it for more than 15 minutes already. 10. How long will you have been reading before you go to bed? I'll have been reading for half an hour before going to bed.

2. Дайте ответы на вопросы по образцам.

A. in the Present Perfect Continuous.

— Why are you so angry? (quarrel with Max). — I am angry because I've <i>been quarrelling</i> with Max.
--

1. Why are her eyes red? (cry).
2. Why are you so dirty? (repair my car in the garage).
3. Why is Kate's coat wet? (walk in the rain).
4. Why, is the Den's mouth blue? (eat bilberries).
5. How did she learn to speak English so well? (live in England).
6. Why is Mike not at the lesson? (wait for Alice).
2. Why is Mary not at the seminar? (look after her little brother).
3. Why haven't they had time to call on us? (arrange their journey).

B. in the Past Perfect Continuous.

- Did she work at the University? — Yes, she did.
- How long had she been working there before she retired? (for 25 years).
- She had been working at the University for 25 years.

1. Did you stay at the hotel when you were in St. Petersburg? ... How long ... when Mary arrived? (for a week).
2. Did they study French before they went to France? ... How long ... (for five years).
3. Did Mr. Smith work at his book last year? ... How long ... before he sent it to the publishing house? (for about a year).
4. Did you play chess yesterday? ... How long ... before you took part in the chess tournament for the first time? (for five years).
5. Did it rain yesterday? ... How long ... before you could go for a walk? (for an hour).
6. Did the Blacks live in Poland in 1940? ... How long ... when the war broke out? (for ten years).
2. Did Kate work at the language laboratory last week ? ... How long ... before she could speak fluently? (for three years).

C. in the Future Perfect Continuous.

- How long will he have been working at the factory by the end of this year? (for twenty years).
- He will have been working there for twenty years.

1. How long will you have been writing your book when I arrive? (for some months).
2. How long will she have been studying English when she enters the University? (for seven years).
3. How long will he have been working at his thesis when his supervisor come back from America? (for half a year).
4. How long will Mrs. Rice have been teaching Russian before she comes to Russia? (for three years).
5. How long will the train have been running when it reaches Tula? (for 12 hours).
6. How long will they have been waiting for Ann when she returns from the concert? (for about four hours).
2. How long will Alex have been using your car before you return from Moscow? (for three weeks).

3. Раскройте скобки и поставьте глагол в нужной временной форме.

1. Ever since A. Volta first (to produce) a source of continuous current, scientists (to form) theories on this subject. 2. The main problem K. Tsiolkovsky (to work) at for many years, (to be) creating a theory of interplanetary travel. 3. This plant (to produce) steel since 1965. 4. This film (to run) for over two months till the next film (to be released). 5. We (to test) the new apparatus for several hours before we (to go) on with our experiment. 6. You (to read) this article since 10 o'clock. It's about midday now and you (to read still) and (not to finish) reading it yet. 7. The Salyut space stations (to serve) for astronomical observations and material processing experiments for more than 30 years. 8. This engineer (to work) at this scientific research institute since 1995. 9. Scientists (to make) these experiments for two months before the head of the laboratory (to arrive). 10. The satellite (to orbit) around the Earth for several years before it (to stop) its operation in 2017.

7. Повторение всех времен

1. Вспомните все времена, проанализируйте и переведите предложения:

А. с английского на русский язык.

1. My brother (work) at a research institute. He (work) there for five years since 2002. This year he (work) at his thesis. He (write) his thesis for some months. Now he (make) experiments at the laboratory. I hope he (to finish) his job by midday and we (to go) to some place to have a snack.

2. Nick (write) a letter when I came. He (write) a letter for an hour when I entered. Nick (not write) a letter yesterday and he (not write) it before my coming. He just (finish) to write his letter and now (to put) it into an envelope.

3. Don't go out, it (rain) now. It (rain) since early morning. I think it soon (stop) raining. It often (rain) in autumn, you know. Two days ago it also (rain) and we (to get) wet through while we (to run) home from the river.

4. Mike (learn) German next year. He (study) German for seven years when he enters the University. He (learn) these new words and (translate) the article by the time you come to see us in the evening. He (to like) German and (to speak) the language rather well.

5. Helen (do) her homework in an hour. She (do) it from 5 till 7 o'clock. She (finish) her work by 7 o'clock and then we (go) for a walk.

Б. с русского на английский язык.

1. — Аня так часто болтает по телефону, ты заметил? О, смотри, она и сейчас разговаривает по телефону. — Как долго она разговаривает? — По-моему, она разговаривает вот уже полчаса. По крайней мере (at least), я жду ее не меньше 30 минут. - Ты уверен, что она будет разговаривать с

тобой после того, как закончит разговор по телефону? — Я не уверен, что она вообще его закончит когда-нибудь.

2. Сегодня я пошел в офис повидать Петра по делу. Мы договорились (arrange) встретиться в три часа дня. Когда я пришел, секретарь сказала мне, что Петр еще не вернулся с конференции, и попросила меня подождать немного. Я сел на стул и начал читать газету, которую я купил по дороге в офис. В то время, как я читал газету, пришел Петр. Он опоздал, так как конференция закончилась позже, чем он ожидал. Он был мне рад и пригласил в кабинет, где мы разговаривали почти целый час.

2. Раскройте скобки и поставьте глагол в нужной форме

1. After important information on the Moon conditions (to obtain), the scientists (to begin) to analyse it. 2. The instrument cabin of a spaceship (to house) various transmitters, power sources and other equipment. 3. Engineers (to test) a new device from 9 to 11 o'clock yesterday. The test (to follow) by the discussion of its advantages. 4. The scientists (to perfect) the operation of this system recently due to the application of new electronic equipment. 5. The station (to place) into the near-earth orbit by 6 o'clock next morning. 6. Last night they (to finish) the experiment which they (to begin) some months before. 7. The control systems, which (to apply) nowadays, (to discuss) at the conference next week. 8. When the dean (to enter) the lecture hall, the professor (to finish) already his lecture. The dean (must forget) that the lecture (to begin) an hour earlier. 9. The energy sources of the world (to decrease) while energy needs of the people (to increase) day after day. 10. Unfortunately, only a little part of solar energy (to use) directly nowadays.

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