

Министерство образования и науки Российской Федерации
НОВОСИБИРСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

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АНГЛИЙСКИЙ ЯЗЫК ДЛЯ СПЕЦИАЛЬНЫХ ЦЕЛЕЙ

ELECTRONICS. INFORMATION
TECHNOLOGIES

Утверждено
Редакционно-издательским советом университета
в качестве учебного пособия

НОВОСИБИРСК
2018

ББК 81.432.1-923

Г 681

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Г 681

Английский язык для специальных целей: Electronics. Information Technologies: учебное пособие / М.Н. Гордеева, Е.В. Гужева. – Новосибирск: Изд-во НГТУ, 2018. – 76 с.

ISBN 978-5-7782-3668-4

Настоящее учебное пособие предназначено для студентов II курса технических специальностей, изучающих английский язык, обучающихся по направлениям «Электроника и нанoeлектроника», «Информатика и вычислительная техника», «Информационная безопасность».

Цель пособия – развитие навыков работы с текстом по специальности на английском языке. Учебное пособие включает разделы, содержащие тексты по направлениям: «Электроника», «Информационные технологии», обширный лексико-грамматический материал, упражнения, направленные на развитие навыков и умений работы с профессионально ориентированными текстами.

В зависимости от целей, поставленных преподавателем, данное пособие может быть использовано для контактной и самостоятельной работы обучающихся.

ББК 81.432.1-923

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**АНГЛИЙСКИЙ ЯЗЫК
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ELECTRONICS. INFORMATION TECHNOLOGIES

Учебное пособие

В авторской редакции

Выпускающий редактор *И.П. Брованова*

Дизайн обложки *А.В. Ладыжская*

Компьютерная верстка *Н.В. Гаврилова*

Налоговая льгота – Общероссийский классификатор продукции

Издание соответствует коду 95 3000 ОК 005-93 (ОКП)

Подписано в печать 28.09.2018. Формат 60 × 84 1/16. Бумага офсетная

Тираж 50 экз. Уч.-изд. л. 4,41. Печ. л. 4,75. Изд. 228. Заказ № 1305

Цена договорная

Отпечатано в типографии

Новосибирского государственного технического университета

630073, г. Новосибирск, пр. К. Маркса, 20

ISBN 978-5-7782-3668-4

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MODULE I. ELECTRONICS

UNIT 1. DIRECT CURRENT GENERATOR

Vocabulary

1. to aid in [eid in] – способствовать
2. alternating current ['ɔ:ltəneitiŋ 'klærənt] – переменный ток
3. armature terminal ['ɑ:mətjuə 'tɜ:minl] – клемма обмотки якоря
4. cast steel [kɑ:st sti:l] – литая сталь
5. commutator ['kɒmjʊ:teitə] – переключатель
6. to convert ['kɒnvɜ:t] – превращать, трансформировать
7. direct current [di'rekt 'klærənt] – постоянный ток
8. eddy-current ['edi 'klærənt] – вихревые токи
9. electron [ɪ'lektɹən] – электрон
10. electrical circuit [ɪ'lektrikəl 'sɜ:kɪt] – электрическая схема
11. electrical energy [ɪ'lektrikəl 'enədʒɪ] – электроэнергия
12. electromotive force [ɪ'lektɹəʊməʊtɪv fɔ:s] – электродвижущая сила
13. field winding [fi:ld 'windɪŋ] – обмотка подмагничивания (возбуждения)
14. ion [aɪən] – ион
15. load resistors [ləʊd ri'zɪstə] – нагрузочные резисторы
16. magnetic field [mæg'netɪk fi:ld] – магнитное поле
17. magnetic flux [mæg'netɪk flʌks] – магнитный поток
18. mount on smth [maʊnt ɒn] – укреплять на чем-либо
19. neutron ['nju:trɒn] – нейтрон
20. output voltage [aʊtpʊt 'vɒlɪdʒ] – выходное напряжение
21. power input ['paʊə 'ɪnpʊt] – потребляемая мощность
22. proton ['prəʊtɒn] – протон
23. salient pole ['seɪljənt pəʊl] – явно выраженный полюс
24. shaft [ʃɑ:ft] – вал

25. the former... the latter ['fɔ:mə... 'lætə] – первый... последний
26. to bolt [bəʊlt] – закреплять
27. to come into being – появляться
28. wattage ['wɒtɪdʒ] мощность в ваттах
29. yoke [jəʊk] – ярмо

1.1. Answer the questions:

- 1) Which household items use electric motors? List as many items as you can.
- 2) What is an electric generator?

1.2. Match the words to make combinations:

- | | |
|------------------|--------------|
| 1) prime | a) flux |
| 2) alternating | b) source |
| 3) battery | c) film |
| 4) electromotive | d) iron |
| 5) output | e) current |
| 6) magnetic | f) voltage |
| 7) insulating | g) converter |
| 8) cast | h) mover |
| 9) energy | i) energy |
| 10) electrical | j) force |

1.3. Fill the gaps with word combinations from 1.2.

- 1) There are two kinds of generator. The first produces direct current, the second type deals with _____.
- 2) _____ is the voltage developed by a source of electrical energy, e.g. battery.
- 3) _____ conducts electric current; therefore it is possible to have stray currents in a system of pipes from this material.
- 4) _____ is the result of the interaction of subatomic particles with electromotive force.
- 5) A special system called Wave _____ is a technology that used the motion of ocean waves to create electricity.
- 6) This polymer is used as a material for making _____.
- 7) A car _____ is a voltage source that has no current limiting. Try overloading it and see what happens.

8) A change in the _____ passing through a loop of conductive wire will cause an electromotive force, and therefore an electric current in the loop.

9) Using this controller we can programme _____ from 0.75V to 3.3V.

10) In the energy industry, _____ drive pumping units, compressors, chillers, and other forms of related equipment.

1.4. Read the text.

Direct Current Generator

Historically, direct current machines came into being before alternating current machines because the scientists of that time (about the middle of the 19th century) were only familiar with battery sources and consequently made motors which operated from batteries, as well as generators to charge the batteries. 1) _____, and will not in the foreseeable future, since the DC motor offers a controllability not yet approached by AC motors. Nevertheless a thorough study of DC generators is necessary 2) _____.

3) _____. Mechanical power input received from a prime mover (DC motor in this case) is converted electromagnetically into electrical energy. This electrical energy can be changed into heat as is done by connecting load resistors across its armature terminals. The field winding of the generator is excited with direct current. It is based on the principle of production of dynamically or motionally induced emf (Electromotive Force). 4) _____, dynamically induced emf is produced in it according to Faraday's Laws of Electromagnetic Induction. This emf causes a current to flow if the conductor circuit is closed.

The field of the machine produces the magnetic flux. It is basically a stationary electromagnet composed of a set of salient poles bolted to the inside of a circular frame. Field coils, mounted on the poles, carry the D.C. exciting current. The frame is usually made of solid cast steel, 5) _____. In some generators the flux is created by permanent magnets. The armature is the rotating part of a DC generator. 6) _____. The core is composed of iron laminations that are forming a solid cylindrical core. The laminations are individually coated with an insulating film so that they do not come in electrical contact with each other. 7) _____.

1.5. Fill the gaps in the text “Direct Current Generator” with phrases given below. There are 3 odd sentences!

- a) It consists of a commutator, an iron core, and a set of coils;
- b) They support the field coil;
- c) Whenever a conductor cuts magnetic flux;
- d) A D.C. generator is an energy converter;
- e) it is made of cast steel;
- f) As a result, eddy-current losses are reduced;
- g) Although superior in many ways, AC machines have not completely replaced DC machines;
- h) Current flows and the poles are electromagnetised and produce the necessary flux;
- i) because the construction of motors and generators is the same;
- j) whereas the pole pieces are composed of stacked iron laminations.

1.6. Match the essential parts of DC generator with their descriptions or functions.

Describe the functions using the combination “the function of ... is ...”

1. Magnetic frame	a) It provides a path of very low reluctance to the flux through the armature from one pole to another one.
2. Pole cores and pole shoes	b) They are used to reduce losses of friction and other mechanical losses.
3. Pole coil or field coils	c) This part rotates inside of an armature.
4. Armature core	d) It is a very useful part of DC generator. Its main work is to take input AC and give output DC.
5. Armature winding	e) They spread out the flux in the air gap and also reduce the reluctance in magnetic path.
6. Commutator	f) It provides mechanical support for the poles as well as mechanical strength for generator machine. It also carries the magnetic flux produced by poles.
7. Brushes	g) It takes supply from commutator and gives output to terminal of generator.
8. Bearings	h) It is a static part of a generator.
9. Stator	i) It carries current and generates electromotive force.
10. Shaft	j) These coils electromagnetise poles which produce the necessary flux.

1.7. Choose the correct word to complete the sentences. Change the form if is necessary. There is 1 odd word!

Conduct; current; magnetic; wires; equation; provide; result from; generate; conductor; exert; force.

1. Electricity is usually carried through buildings by _____.
2. _____ is something through which electricity can pass.
3. J. Maxwell produced _____ proving the electric and magnetic field to act as one.
4. To _____ power you need a way to control electricity.
5. An electrical _____ supplies power in houses.
6. The electromagnetic field _____ a force on the particles.
7. A magnetic field _____ the motion of the electric current.
8. _____ compasses on the ships were affected by lightning.
9. No battery can _____ enough electrical power to operate a machine.
10. Physicists all around the world _____ experiments with electricity and magnets.

1.8. Answer the question: which materials can be used for parts of a generator? Match the DC generator parts and the materials given below.

DC generator parts: magnetic frame, armature core, brushes, stator, commutator, armature winding.

Materials: copper, cast steel, iron / steel, cast iron / steel, carbon / graphite.

1.9. Translate into English.

- 1) Постоянный ток – это ток, который течет в одном направлении.
- 2) Электроника – это наука, изучающая взаимодействие электронов и других заряженных частиц с электрическими, магнитными и электромагнитными полями.
- 3) Электрический ток – это движение заряженных частиц по проводнику в определенном направлении.
- 4) Для того чтобы выяснить, как получают переменный ток, рассмотрим устройство генератора переменного тока.
- 5) Электромеханическое действие магнитного поля заключается в том, что находящийся в поле проводник подвергается действию силы этого поля.

6) На силовом действии магнитного поля основана работа электрических двигателей, реле и пр.

7) Вещества, у которых внутреннее (inner) магнитное поле в несколько сотен раз превышает внешнее (outer) магнитное поле, называют ферромагнетиками.

8) Действие индукционных аппаратов основано на взаимодействии тока и магнитного поля.

9) Электродвигатель состоит из ротора и статора, между которыми находится воздушное пространство.

10) В обмотку якоря, подключенного к источнику переменного тока, подается постоянный ток от внешнего источника.

1.10. Study the Gerund forms and complete the exercises below.

	Indefinite	Perfect
Active	connecting <i>He denied connecting these devices.</i>	having connected <i>He admitted having connected these devices.</i>
Passive	being connected <i>Denying being connected with this case of fraud he agreed to meet the police.</i>	having been connected <i>After having been connected these wires provide current properly now.</i>

State the form of the Gerund. Translate the sentences.

1. This experiment does not require doing the same things all the time.
2. I thought that I am capable of conducting the research on my own, but my scientific advisor insisted on helping me.
3. Writing scientific papers is a must for every scientist.
4. It is no use searching for another approach.
5. He insisted on taking part in the scientific conference.
6. The author reports having applied a new method.
7. Avoid mixing these two substances, it could be dangerous.
8. Talking about the generator working principle, there is one more point worth mentioning.
9. Low electric conductivity of this new material resulted in its being used in cables.

10. Toolmakers usually say that they like working with hands and making dies.

11. Hardness is the ability to withstand being stretched or bent.

12. It's no use being an engineer if you don't want to improve people's life.

1.11. Create seven sentences using different forms of the Gerund.

1.12. Match the parts of the sentences in A and B columns.

A	B
1) Production engineers are responsible for	a) having no electrical contact with each other.
2) Having set the theme of research, think about	b) setting clear objectives.
3) Working in a team, you should not aim at	c) getting electric shock.
4) The iron sheets are coated with an insulating film; it results in	d) making production process efficient and also choosing safe materials.
5) Satisfying results of the work depend on	e) accelerating reactions.
6) Do not touch the wire to prevent yourself from	f) employing such methods.
7) Catalysts aid in	g) being knocked down.
8) He was capable of	h) conducting some experiments.
9) He did not insist on	i) an armature himself.
10) Beware the truck! Avoid	j) doing everything yourself.

1.13. Open the brackets using the correct form of the Gerund.

1) He admitted (make) a mistake in his previous calculations.

2) We do not mind (undertake) this research together with you.

3) (Study) of DC generators is a necessary thing.

4) J. Maxwell's new equations meant (rewrite) of existing theories on the motion of objects.

5) He succeeded in (obtain) reliable results.

6) By (generate) and (control) electromagnetic fields we have electricity everywhere.

7) They prided themselves (be) the first to invent this mechanism.

8) Electrical energy can be changed into heat by (connect) resistors across armature terminals.

9) She avoided (do) wrong constructing the electro scheme.

10) It's no use (take) these batteries, they need to be recharged.

11) I think of (try) another approach.

12) The behaviour of current was verified by (analyze) experimental curves.

1.14. Write down nine sentences with the Gerund of the verbs below.

Verbs: to do, to praise, to turn on, to rotate, to complete, to feed, to move, to put, to induce.

1.15. Make a report about generator protection from different faults. Think about:

1) Types of faults.

2) Types of protection.

3) Tools or techniques needed to protect.

UNIT 2. SEMICONDUCTOR DEVICES

Vocabulary

1. active region ['æktiv 'ri:dʒən] – активная область
2. carrier ['kæriə] – носитель
3. cladding layer ['klædiŋ 'leiə] – плакирующий слой
4. coherent [kəʊ 'hiərənt] – когерентный
5. compatible [kəm 'pætəbl] – совместимый
6. emission [i 'miʃn] – излучение
7. induced [m 'dju:st] – индуцированный
8. infrared [m 'frə 'red] – инфракрасный
9. junction [dʒʌŋkʃn] – соединение
10. laser diode ['leizə 'daɪəd] – лазерный диод
11. lattice constant ['lætɪs 'kɒnstənt] – постоянная (параметр) решетки
12. light-emitting diode [laɪt i 'mitɪŋ 'daɪəd] – светодиод
13. optoelectronics [ɒptəʊ 'lektroʊnɪks] – оптоэлектроника
14. photoconduction ['fəʊtə kən 'dʌkʃn] – фотопроводимость

15. photodiode ['fəʊtə'daɪəʊd] – фотодиод
16. photoinduced [m'dju:st] – фотоиндуцированный
17. photovoltaic effect [fəʊtvəʊl'teɪk ɪ'fekt] – фотовольтаический эффект
18. pn-junction – p-n-переход (электронно-дырочный переход)
19. range [reɪndʒ] – диапазон
20. semiconductor ['semɪkən'dʌktə] – полупроводник
21. to emit [ɪ'mɪt] – испускать, излучать
22. to recombine [rɪkəm'baɪn] – перекомбинировать
23. to shift [ʃɪft] – сдвиг, переключение
24. wavelength ['weɪvlɛŋθ] – длина волны

2.1. Answer the questions: what is optoelectronics? Which devices are called semiconductors?

2.2. Choose the right translation of the word:

- 1) **fabrication** а) соединение б) изготовление в) создание д) изобретение
- 2) **range** а) ряд б) вид в) размер д) способ
- 3) **emission** а) создание б) изготовление в) миссия д) излучение
- 4) **current** а) протекание б) в течение в) ток д) течение
- 5) **take part** а) частично б) участвовать в) принимать д) входить в состав
- 6) **property** а) способность б) выбор в) свойство д) возможность
- 7) **consumer** а) преимущественный б) поглощение в) поглощающий д) потребитель
- 8) **coherent** а) связный б) гармоничный в) волновой д) проводящий
- 9) **operating mechanism** а) работающее устройство б) механизм операции в) принцип работы д) управляя устройством
- 10) **junction** а) соединение б) союз в) присоединение д) объединение

2.3. Fill the gaps with the words and combinations: *active region, range, semiconductor, junction, carrier, infrared, cladding layer, photovoltaic effect, optoelectronics, coherent light.*

1. _____ is a line of some things or products having something in common.

2. A wire providing people with electricity can be called an electricity _____.
3. Place where two wires meet is their _____.
4. Material having a characteristic of carrying electrical current is a _____.
5. There are several types of emission: ultraviolet, _____, x-ray, gamma etc.
6. In the field of _____ special tubes providing various kinds of light are studied.
7. _____ is a situation when current is caused by sunlight.
8. _____ is surface that appears as a result of covering conductive surface with metal.
9. _____ is usually monochromatic and the most common source of light for practical uses.
10. _____ are loop structures connecting points of opposite magnetic polarity.

2.4. Read the text.

Optoelectronic Semiconductor Devices

Optical semiconductor devices are widely used, in fields ranging from optical fiber communication systems to consumer electronics, and have become necessary devices in the equipment and systems making up the infrastructure of our society. Most optical semiconductor devices are optoelectronic pn-junction devices, such as **laser diodes, light-emitting diodes, and photodiodes**. The main interest in the field of optoelectronic devices has shifted from device physics and operation principles to device applications. That is why we require a wide range of knowledge related to optoelectronic semiconductor devices.

The successful fabrication of a diode laser relies upon the properties of the materials involved. At least two compatible materials must be found, one for the cladding layers and another for the active region. The fundamental requirement for these materials is that they have the same crystal structure and nearly the same lattice constant.

The basic operating mechanism of **laser diodes** is based on the electrical and optical properties of pn-junctions and semiconductor materials. Laser diodes are devices emitting coherent light produced in a stimulated emission process. The light emission process in laser diodes is

more complicated than that in LEDs, where light is produced in a spontaneous emission process. The lasing wavelength ranges from the visible to the infrared depending on the material of the active layer.

Light-emitting diodes (LEDs) are used under a forward bias that emits incoherent light when current passes through the semiconductor junction. When the minority charge carriers recombine radiatively with the majority charge carriers, photons are emitted. This is the basic light generation process in semiconductors.

Depending on the semiconductor material used in the light-emitting layer (active layer), the wavelength of the emitted light can be anywhere within the range from visible to infrared. LEDs have been widely used in optical fiber communication systems, data links, remote controllers, for display and indicator applications, etc.

Photoinduced electrons and holes recombine radiatively (photoluminescence) and non-radiatively. If an electrical field is applied to the semiconductor, some of the induced carriers take part in electric conduction and this leads to a decrease in electrical resistance of the semiconductor. This is called photoconduction.

If there is a pn-junction in the illuminated area, the electrons and the holes are separated by the electrical field at the pn-junction without any electric bias, and an electromotive force between the p- and n-side semiconductors is generated. This is called the photovoltaic effect.

Based on the phenomena described above, light power can be converted into electrical power in **photodiodes**. Their operating mechanisms are based on the electrical and optical properties of the pn-junction and semiconductor material. Their functions are, however, quite different from those of LEDs and laser diodes, and in the photodiodes the optical absorption processes are used.

2.5. Read the text “**Optoelectronic semiconductor devices**” and say if these statements are True, False or Not mentioned.

- 1) Optical semiconductor devices can be divided only into three groups.
- 2) A crystal lattice may include cubic crystals.
- 3) The work of a diode also depends on its composition.
- 4) Laser diodes work using electromagnetic forces.
- 5) Optical fiber is one of the materials used in diodes.
- 6) Although there are various types of diodes, they have similar functions.

7) Photovoltaic effect means that electrons and the holes are separated by electric bias.

8) In light-emitting diodes light is produced in a stimulated emission process.

9) In one of the diode types light can be changed into electricity.

10) The structure if a diode laser has two layers.

2.6. Which words are defined below?

1) The distance over which the wave's shape repeats.	a) Diode
2) Coating lying between/on something.	b) Laser
3) Threads used to carry light.	c) Charge
4) To give something off.	d) Lattice constant
5) Device that converts energy into coherent radiation flux.	e) Wavelength
6) Spectrum of some objects.	f) Junction
7) Length that denotes the size of the unit cell in a crystal lattice.	g) Range
8) Place where two wires meet.	h) Layer
9) Property defining the ability of objects to create electromagnetic field.	i) Emit
10) An electrical element of two main types that conducts current.	j) Optical fiber

2.7. Add a word or a part of a word to complete the following:

- 1) opto _____
- 2) photo _____
- 3) _____ conductor
- 4) pn- _____
- 5) laser _____
- 6) _____ -emitting
- 7) _____ length
- 8) _____ layer
- 9) electric _____
- 10) _____ -radiatively

2.8. In the text, find and translate sentences with the following words and combinations: **широко используемый, зависящий от, отличаться от, принимать участие, основываться на, применяться к, основное требование, по меньшей мере, главный интерес, сместился от.**

Create your own sentences and use at least 7 combinations.

2.9. Write more keywords expressing the ideas from the text: **optical semiconductor devices, laser diodes, ...**

Retell the text using these keywords.

2.10. Study the grammar rule.

The use of the Gerund

The Gerund is used after:

1. Verbs followed by prepositions: accuse of, apologize for, forgive for, insist on, object to, thank for, think of, etc

They succeeded in doing such a difficult experiment.

Thank you for asking this question.

Are you thinking of continuing your research?

2. Nouns used with prepositions: chance of, importance of, mistake of, opportunity of, plan for, reason for, purpose of, preparation for, way of, etc.

He had no chance of conducting the experiment in a right way.

We will have an opportunity of meeting our colleagues there.

Do you have any reason for asking me to do it?

3. Phrasal verbs: burst out, give up, go on, keep on, etc.

She gave up working at this topic a year ago.

He keeps on asking this question all this month.

He bursts out laughing every time I ask about his research.

4. The following verbs: avoid, consider, deny, involve, mind, postpone, recall, risk, etc.

You can hardly avoid meeting her.

He denied making this mistake.

My work involves collecting the samples.

5. Word combinations: be afraid of, be angry for, be guilty of, be interested in, be aware of, be fond of, have difficulty in, be no use, be used to, etc

There is no use doing it again.

She was afraid of making a mistake.

Did you have any difficulty in obtaining the results?

6. Prepositions: after, before, besides, in spite of, without, on, by, instead of.

They worked ten hours without stopping.

After putting the samples in the nanotube she made some notes.

They continued working in spite of having problems.

2.11. Translate the Russian part of the sentence into English.

1) Do you have (затруднение в рисовании) electric scheme?

2) He (заинтересован в получении) a patent for his invention.

3) Systems analysts have been working with an immediate task through the night (без остановки).

4) (Бесполезно пробовать) this material: it's not strong enough to bear such weight.

5) The work of electrician (включает прокладывание проводов и установку) electrical equipment.

6) Turning on too many household devices at the same time, you risk (вызвать перегрузку).

7) There are different ways (решения этой проблемы).

8) Do we have (причины соединять) these wires another way?

9) He likes his job. It made him (привыкнуть к тестированию) lots of samples.

10) The factory (прекратила выпуск) turbines due to financial problems.

2.12. Transform the given sentences using the verb in brackets with the Gerund.

Model: I cannot find my friend. She is not at home. (*try*) – *Try phoning her at work.*

1) He was an experienced worker. However we had to sack him because of skipping his shift. He did it several times without any reason. (*regret*)

2) It is a tricky situation! I think you need to consult an expert. (*recommend*)

3) I see a lot of new equipment in your laboratory. What are you going to use it for? (*intend*)

4) Your remote control is not working. Maybe you should change the batteries. (*try*)

5) If you follow the instruction, the installation will be successful. (*depend on*)

6) I have written down most of the information, but missed one fact about laser diodes application. Could you repeat it once more, please? (*not remember*)

7) He was asked many questions about his research. But his work was a secret one. (*decline*)

8) It was a line of difficult experiments, but you helped me a lot. (*appreciate*)

9) This material does not have an appropriate crystal structure. We won't work with this material anymore. (*stop*)

10) Working in optoelectronics you need knowledge from physics, operation principles and applications of various devices. (*require*)

2.13. Use the list of verbs given to write all possible Gerund forms of them.

Then make word-combinations 'gerund + noun / pronoun'.

To conduct, to generate, to consider, to fabricate, to emit, to apply, to illuminate, to operate, to separate, to absorb.

2.14. Fill the gaps with an appropriate form of the verb (the Infinitive / the Gerund / the Participle).

Provide, produce, modify, need, create (x2), apply, require, use, grow, control

1. Silicon is used _____ most semiconductors commercially, but dozens of materials are _____ as well.

2. The resistance of semiconductors is normally modified by _____ electric fields.

3. Transistors are combined with capacitors and resistors _____ complete electronic circuits.

4. This is useful for fiber optic communications and _____ the basis for energy from solar cells.

5. The level of chemical purity _____ is extremely high.

6. To make a semiconductor device you need a _____ level of chemical purity and perfection of the crystal structure.

7. A technique for achieving high purity includes ____ the crystal using the Czochralski process.

8. We need a special temperature ____ electrical properties.

9. Electric fields are ____ by junctions between regions of n- and p-types of semiconductors.

10. Semiconductors' electrical properties are often permanently ____ by introducing impurities through doping process.

2.15. Make a presentation about where semiconductors are used. You may choose the sphere of production, everyday life, or electronics etc.

UNIT 3. SAVING SPACE OF ELECTRONIC SYSTEM

Vocabulary

1. board space [bɔ:d speɪs] – площадь монтажа
2. buck converter [bʌk kən'vɜ:tə] – понижающий преобразователь
3. capacitor [kə'pæsɪtər] – конденсатор
4. capacity [kə'pæsɪtɪ] – емкость, вместимость
5. to consume [kən'sju:m] – потреблять
6. conversion stages [kən'vɜ:ʃn [steɪdʒ] – фазы преобразования
7. converter [kən'vɜ:tə] – преобразователь, конвертер
8. eventually [ɪ'ventʃəli] – в итоге
9. hazard ['hæzəd] – угроза
10. higher-frequency ['haɪə 'fri:kwənsɪ] – высокочастотный
11. initial [ɪ'nɪʃəl] – исходный
12. integrated circuit ['ɪntɪɡreɪtɪd 'sɜ:kɪt] – интегральная схема
13. load transient [ləʊd 'trænzɪənt] – временная нагрузка
14. loose [lu:s] – незакрепленный
15. overcrowded [əʊvə'kraʊdɪd] – переполненный
16. portable ['pɔ:təbl] – переносной
17. power line ['paʊə laɪn] – линия электропередач
18. power point ['paʊə pɔɪnt] – силовая точка
19. ratio ['reɪʃiəʊ] – соотношение
20. to shrink [frɪŋk] – уменьшаться, сжиматься
21. step-down [step daʊn] – понижающий
22. to compromise ['kɒmprəmaɪz] – подвергать опасности

23. to overcome [əʊvə'kʌm] – преодолевать
 24. to rescale [ri:'skeɪl] – изменять масштаб
 25. topology [tə'pɒlədʒɪ] – топология

3.1. Answer the questions:

1) Is it possible to save space in power supply system?

2) Discuss how the following can save space:

- Using smaller devices;
- Cutting down the power you need;
- Making changes in the electrical scheme.

3.2. Match the synonyms.

- | | |
|-----------------|----------------|
| 1. downsize | a. energy |
| 2. space | b. dimension |
| 3. manufacturer | c. compress |
| 4. power | d. wave |
| 5. size | e. decrease |
| 6. save | f. correlation |
| 7. shrink | g. producer |
| 8. ripple | h. room |
| 9. expand | i. broaden |
| 10. ratio | j. economize |

3.3. Join the parts of the sentences.

1) Power electronics is the application of solid-state electronics	a) found in many consumer electronic devices, e.g. television sets, personal computers, battery chargers, etc.
2) An AC/DC converter the most typical power electronics device is	b) to a few hundred microseconds, depending on the device.
3) Electronic and electrical engineering deals	c) slow speed and are useful for power frequency switching and control.
4) Converting AC power to AC power allows	d) inverters has gained great interest.
5) Some diodes and thyristors are suited for relatively	e) to the control and conversion of electric power.
6) In modern systems the conversion is performed	f) energy loss in the transitions.
7) A relatively new class called multilevel	g) with the design, control, computation and integration of nonlinear, time-varying energy-processing electronic systems.

8) <i>Faster switching devices minimize</i>	h) simulation programs such as PLECS, PSIM and MATLAB.
9) <i>Power electronic circuits are simulated using computer</i>	i) with semiconductor switching devices such as diodes, thyristors and transistors.
10) <i>Switching times range from tens of nanoseconds</i>	j) to control the voltage, frequency, and phase of the waveform.

3.4. Read the text “Using power, saving space” and answer the questions:

- 1) What are the advantages of saving space of electronic power supplies?
- 2) Which way was used to make the change in system possible?
- 3) Which ways to decrease the dimensions of the power supply are there?
- 4) Would the innovation be useful for all kinds of electronic systems?
- 5) How does the innovation influence the economical side of production?
- 6) Does the reduced space mean expanding of functionality of the device?
- 7) Why is saving space innovation important?
- 8) What is the purpose of the first products with the innovation?
- 9) What does any electronic system operate on?
- 10) Which part of the system space can be saved using the new method?

Using power, saving space

Imagine if on-board electronic power supplies could suddenly **shrink** to 20 percent or less of their previous size. For most users, this doesn't mean much because they pay little attention to power supplies, even though power supplies typically **consume** up to half of the board space of an electronic system. It would mean that equipment could suddenly be much smaller and lighter-weight.

Portable devices would become more mobile than ever. Large equipment could pack more channels and features into less space without overheating. Aerial drones could stay longer without charging. In short, every area of electronics could benefit from such a radical rescaling of power supplies.

This level of system rescaling is now possible with a new capacitive conversion **topology** for on-board power supplies introduced by Texas Instruments (TI). The innovation is designed for step-down applications that convert power inputs from higher to lower voltages, and it enables much higher-frequency operation than was previously used in similar chips. TI's first integrated circuit (IC) products employing the new topology are targeted at communications infrastructure, mass storage and test and measurement applications. Manufacturers can provide more functionality without having to expand the system.

Every electronic system operates on power supplied from a battery or **power line** source. **Eventually** battery-operated systems will benefit from the new topology, but initial products are focused on line-powered systems. Power conversion is often a multi-stage operation, especially when the initial input voltage is much greater than the voltages used by components in the equipment.

One way to reduce the size of the overall power supply is to use fewer conversion stages, which is possible when the converters offer a large **ratio** of input voltage to output voltage.

Another way to downsize the power supply is by **rescaling** the components within the converters. Given that power supplies account for about 30 to 50 percent of the space in many systems, the space savings can be significant. But slimming down buck converters has not been easy, as the following section explains. Finally, another important design challenge is that the power supply must provide a high output current, so that the converter can drive a high-current device such as a microcontroller, or several lower-current devices.

The innovative buck converter design meets these challenges by achieving high-frequency operation with a high voltage input-to-voltage output ratio and with a high output current. Without compromising operating efficiency, TI's capacitive conversion topology reduces size, allowing innovators to design applications that are smaller and lighter-weight and pack more high-performance processing and features into the same space. The new converter also reduces the bill of materials, which could reduce the overall system cost.

The voltage across the capacitor minimizes power losses during switching, since a lower voltage swing means less power loss on each cycle. Other advantages that help improve the output quality and reduce design complexity include reduced inductor current ripple, automatic current

balancing between inductors, a soft charge and discharge through the capacitor, a doubled on-time and excellent load transient response. All of these help to **overcome** challenges in creating small-size, high-**frequency** voltage regulators.

3.5. Fill the gaps with words given in bold in the text. Change the form of the verb, if it is necessary.

1. A laptop is a ____ computer, you can take it wherever you want.
2. ____, we have come to an appropriate decision.
3. It's very dangerous to play with a kite near a ____!
4. When something decreases in size, it ____.
5. ____ of an electrical scheme is its geometry, the way how electrical circuits are organized.
6. We need to find reliable equipment that can ____ difficulties in case of circuit failure.
7. Converter is an electrical device that can transform ____.
8. Several devices working at the same time ____ too much energy and can cause power failure.
9. The ____ of the components in this substance is inappropriate for this experiment.
10. You can easily ____ it using the mouse wheel.

3.6. Find and correct mistakes in spelling / use of vocabulary / grammar in the text below. The total number of mistakes is 15.

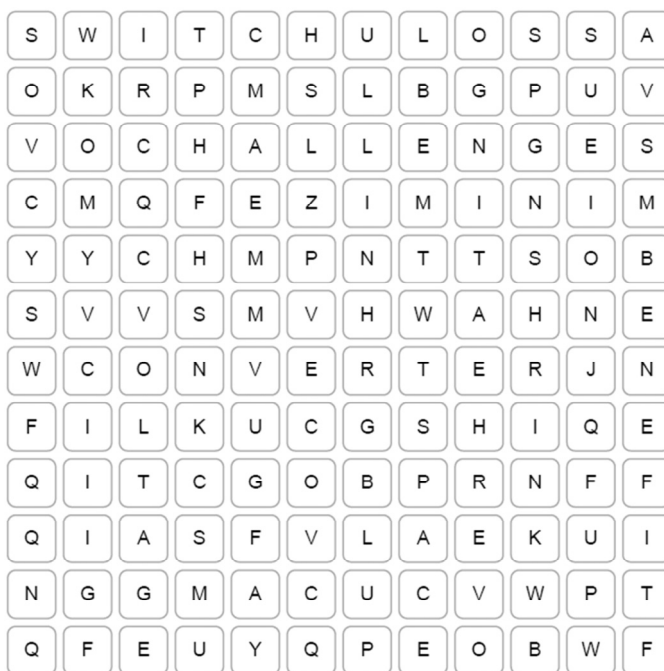
DICE+ is a computer that allow people to enjoy digital versions of their favorite board games where having pleasure and excitement of rolling the dice. DICE+ is a smart electronic dice that uses motion-sensing, data-processing, and power-management teknologies. Players hold DICE+ in their hands, shake it and roll it, just as they would with traditional dice. The result is displayed on the dice himself for everyone to have been seen. Simultaneously, it is also being communicated wirelessly to the mobile device that is hosted the game.

Cheating are not possible; holding the device in a particular position and then rolling it gently to achieve a desired result will not work because this smart dice knows when it has been properly rolled. Its motion sensors and computing brain can calculate how many times it has tumbled to decide if this was a fair throw. It doesn't have an on/off switch, either.

The DICE+ combines three key technologies: tiny sensors that might detect and measure movement and orientation, microcomputers that are thousands of times more powerful than those that powered the first space explorations, and sophisticated chips that monitor and control the flow of electrical power inside the dice.

3.7. Find in word search below English equivalents of given Russian words. Use only straight directions: UP, DOWN, RIGHT, LEFT. Words do not cross.

Переключать, минимизировать, пространство, уменьшаться, перегрев, препятствия (испытания), потери, конвертер, выгода, напряжение.



3.8. Play “The Gallows”. Play this game in pairs or with the whole group. Choose and keep in secret one of the words from this unit. Then draw as many lines as there are letters in this word. Make students name the

letters and write the right ones. If the letter is wrong, begin to draw a gallows tree and a hanging man. When the word is guessed, choose another one.

3.9. Study the grammar rule.

The Gerundial Construction

The combination in which the Gerund has its own subject is called The Gerundial construction. The subject of the Gerund can be expressed by a noun or pronoun.

Translation into Russian: *a clause mostly introduced by **то, что** / **тем, что** / **как**.*

- An action of a living being is expressed by a possessive case or possessive pronoun:

*Can you stop **them making** noise? (It's forbidden to shout in the laboratory). – Не могли бы вы сделать так, чтобы они не шумели? (Кричать в лаборатории запрещено).*

- An action of some object is shown by a noun in the common case:

*Her speaking was interrupted by **the door opening**. – Ее речь была прервана тем, что открылась дверь.*

3.10. Translate into Russian. State the subject of the Gerund.

1. The Chairman suggested our meeting next day.
2. I can't stand his interfering with what I do.
3. Mind system overheating and pack less channels in its space.
4. Their rescaling the components was argued to be a way to downsize the power supply.
5. We understand the reducing of the size becoming essential in today's electronics.
6. The spy entered the laboratory without anyone seeing him.
7. I can't imagine their finishing before the deadline.
8. Security organizations would fancy quadcopters staying longer in the air.
9. Most of consumers don't mind power supplies taking nearly half of the space in a system.
10. Journalists admitted the company demonstrating customer care.

3.11. Translate from Russian using Gerundial phrases.

1. Он настаивает, чтобы вы ответили ей незамедлительно.
2. Мы слышали, что он назначен директором этой компании.
3. Мы отвечаем за то, чтобы проект был закончен вовремя.
4. Директор настоял, чтобы меня отправили в командировку.
5. Вы можете рассчитывать, что он выполнит свою работу великолепно.
6. Начальник отдела разработок настоял, чтобы презентация улучшенной версии продукта была проведена в среду.
7. Мы учитывали минимизацию энергетических потерь во время переключений.
8. Заказчики оценили его упоминание о снижении стоимости из-за уменьшения размера устройства.
9. Производители обещают повышенную функциональность без перегрузки системы.
10. Я надеюсь, что в нашем цехе появится новое оборудование.

3.12. Noughts and crosses game.

Draw the table on the board:

their having supplied	his breaking through	engineers' developing
designers' minimizing	my having challenged	our achieving
him allowing	innovator's converting	her causing

Divide the class into two teams: “Noughts” and “Crosses”. Make them choose the cell with the Gerundial construction and let tell the sentence with it. They are to play “Noughts and crosses” trying to prevent the second team winning.

You have to cross out the used cell.

3.13. You are working for a company designing electrical household appliances. Create a product or modify the one that already exists. Make notes about this product. Then give a presentation of it saying:

- the type of device;
- advantages and disadvantages of the device;

- how to use it;
- which precautions should be followed.

Listen to other presentations and discuss which device is the most helpful, user-friendly and safe.

UNIT 4. BATTERIES

Vocabulary

1. ambient ['æmbiənt] – внешний
2. blaze [bleiz] – вспышка, пламя
3. challenge ['ʃælɪndʒ] – задача, вызов
4. chemically bound ['kemɪklɪ baʊnd] – химически связанный
5. compound ['kɒmpaʊnd] – соединение
6. constituents [kən'stitjʊənts] – составляющие
7. conventional [kən'venʃənl] – обычный
8. excess [ɪk'ses] – превышение, избыток
9. exposed [ɪk'spəʊzd] – выставленный, открытый
10. lithium ['lɪθiəm] – литий
11. oxidation [ɒksɪ'deɪʃn] – окисление
12. porous ['pɔːrəs] – пористый
13. production [prə'dʌkʃn] – производство
14. reduction [rɪ'dʌkʃn] – редукция, сокращение
15. row [rəʊ] – ряд
16. solid ['sɒlɪd] – твердый, цельный
17. surface ['sɜːfɪs] – поверхность
18. to swell up [swel ʌp] – распухать, вздуться
19. thin-film [θɪn-fɪlm] – тонкопленочный
20. to seep [si:p] – проникать, просачиваться
21. to temper ['tempə] – закалять
22. ultimately ['ʌltɪmɪtli] – в конечном счете, в итоге
23. viscous ['vɪskəs] – вязкий, тягучий

4.1. Choose an appropriate variant for each gap.

In 1800, as the result of a professional 1)_____ over the galvanic response presented by Luigi Galvani, Alessandro Volta developed a 2)_____

of the battery, which 3)_____ a steady electric current. Volta had determined that the most effective pair of metals 4)_____ electricity was zinc and silver. In 1861 the name "volt" was given to the 5)_____ of resistance. In 1881, the International Electrical Congress made the volt 6)_____ to 10^8 cgs units of voltage. The cgs system (centimetre–gram–second system) at the time was the 7)_____ system of units in science. 8)_____, the volt was defined as the potential difference (nowadays is called the "voltage difference") across a 9)_____ when a 10)_____ of one ampere dissipates one watt of power.

- 1) disagreement / difference / agreement / interest
- 2) descendant / generation / forerunner / sibling
- 3) developed / produced / created / hold
- 4) producing / production / productive / having produced
- 5) system / unit / number / mark
- 6) equal / number / received / resemble
- 7) customary / future / written / potential
- 8) at last / the last years / nowadays / at that time
- 9) current / loop / conductor / capacitor
- 10) resistance / current / tension / temperature

4.2. Join the given combinations into sentences. You can add any words you need. Combinations can be used more than once.

Model: *Batteries produced like this could be left sitting out in the sun without consequences.*

A

sitting out in the sun
the environment
charge a battery
the researchers are able to
thanks to the trick with

B

danger
at higher temperatures
make sure that
produced like this
the negative pole

4.3. Answer these questions. More than one answer is possible.

1. If you leave a battery in the sun for a long time...
 - a) ...it will heat.
 - b) ...it can explode.
 - c) ...nothing will happen.

2. Poles in common batteries are:
 - a) Positive and neutral.
 - b) Positive and negative.
 - c) Negative and neutral.
3. Ions inside a battery...
 - a) ...move from one pole to another.
 - b) ...stay in electrolyte.
 - c) ...circulate and cause heating.
4. If an electrolyte is solid, it will...
 - a) ...let charges move freely.
 - b) ...provide more power.
 - c) ...make heating of a battery safe.
5. Materials for battery electrodes are:
 - a) Gel and conductive.
 - b) Solid and conductive.
 - c) The material doesn't matter.

Skim the text “Li-ion Batteries Improve Safety” and check your answers.

4.4. Read the text.

Li-ion Batteries Improve Safety

Conventional lithium-ion batteries are not without their dangers: mobile phone batteries have exploded several times, resulting in injuries, and an entire row of houses burned down. The blaze was caused by a battery that caught fire being charged improperly.

In conventional lithium-ion batteries as well as in most other batteries, the positive and negative poles – the two electrodes – are made of solid conductive compounds; charges move between these electrodes in a liquid or gel electrolyte. If you charge such a battery improperly or leave it sitting out in the sun, the liquid can ignite or the gel can swell up.

This is not the case with solid-state batteries, which are currently in development worldwide: in these types of batteries, both the electrodes and the electrolyte are made of solid material. "Solid electrolytes do not catch fire even when heated to high temperatures or exposed to the air," explains Jennifer Rupp, Professor of Electrochemical Materials. One of the

challenges in developing solid-state batteries is to connect the electrodes and electrolyte in such a way that the charges can circulate between them with possibly little resistance.

Researchers constructed a sandwich-like battery featuring a layer of lithium-containing compound, which acts as a solid electrolyte between the two electrodes. This compound is one of the materials with the highest known conductivity for lithium ions.

During production, it is important to make sure that the solid electrolyte layer obtained a porous surface. The researchers then applied the material of the negative pole in a viscous form, allowing it to seep into the pores. Finally, the scientists tempered the battery at 100 degrees Celsius.

Thanks to the trick with the pores, the researchers were able to significantly enlarge the contact area between the negative pole and the solid electrolyte, which ultimately means that the battery can be charged faster.

Batteries produced like this could theoretically operate at a normal ambient temperature. But they work best at 95°C and above at the current development state. This characteristic could be put to use in battery storage power plants, which store excess energy and deliver it later as needed. By coupling battery power plants with industrial facilities, we could use the waste heat to operate the storage power plant at optimal temperatures.

Thanks to this solid electrolyte one can not only operate batteries at higher temperatures, but also build thin-film batteries, that can even be directly placed on silicon chips. The immediate next step is to optimize the battery, with a particular focus on further increasing the conductivity of the electrode-electrolyte interface.

4.5. State the right order of the ideas according to the text. There are two extra sentences.

- A) The environment in a battery has been changed.
- B) The innovation improved the performance of the battery.
- C) Lithium-ion batteries have some disadvantages that can have unpleasant consequences.
- D) Charges travel inside the battery in a special environment.
- E) One of the tasks for researchers is to develop solid electrodes and gel electrolyte.
- F) The electrodes in a battery are usually made of materials with the same properties.

- G)** Developing the new battery type scientists conducted some experiments.
- H)** The layer added inside the battery can conduct ions.
- I)** In the laboratory a battery with a gel electrolyte was constructed.
- J)** Some characteristics of battery need to be improved.

4.6. Match the opposites from the left and right columns:

- | | |
|---------------|---------------|
| 1. solid | a. wrongly |
| 2. properly | b. dense |
| 3. ambient | c. gaining |
| 4. conductive | d. ruin |
| 5. expose | e. weaken |
| 6. improved | f. hide |
| 7. loss | g. internal |
| 8. construct | h. dielectric |
| 9. porous | i. liquid |
| 10. temper | j. degraded |

4.7. Skim the text and find the words defined below. The words are given in order of their appearance in the text. The number of letters is given in the gaps.

- 1) A thing that one can use to power devices of different size and functions. (7 letters)
- 2) An element discovered in 1817, which name is translated as “stone”. (7)
- 3) A conductor having some positive or negative charge. (9)
- 4) A substance with chemically bound constituents. (8)
- 5) A conductive substance. (11)
- 6) One of the states of a substance, neither liquid nor gaseous. (5)
- 7) An action describing invention of something, its building or creation. (9)
- 8) Tiny channels threading a surface. (5)
- 9) Property, feature or parameter. (14)
- 10) The next action, next movement or objective. (4)

4.8. Match the synonyms from the left and right columns. There is one extra word in each column!

- | | |
|-------------------|---------------|
| 1) characteristic | a) solid |
| 2) facilities | b) catch fire |

- | | |
|--------------|----------------|
| 3) operate | c) technique |
| 4) next | d) move around |
| 5) trick | f) following |
| 6) circulate | g) increase |
| 7) ignite | h) control |
| 8) surface | i) property |
| 9) enlarge | j) equipment |

4.9. Build a word-chain naming the words from the field of electrical engineering. The next word should begin with the last letter of the previous one. The person who cannot say the next word is out of the game.

4.10. Study the Grammar rule and complete the task below.

Gerund and Verbal Noun

The Gerund	The Verbal Noun
– has tense and voice forms <i>He praised himself for having done this work.</i>	– can be plural <i>We can use his findings in our work.</i>
– can take a direct object <i>I went on reading an article.</i>	– can have an article <i>They could hear the ticking of the clock.</i>
– can be modified by an adverb <i>I kept reading fast.</i>	– can take an attributive prepositional phrase <i>They hear the ticking of the clock.</i>
– can be part of a predicate <i>We've begun collecting the data.</i>	– can be modified by an adjective or pronoun <i>I could just see a faint glimmering of light in the distance.</i>

Translate into Russian. State the form of the verb (Gerund, Verbal Noun).

- After being charged improperly batteries can cause fire.
- Making electrolyte solid means creating a safe battery.
- By adding a solid layer between electrodes, we may improve conductivity.
- Studying the following examples, the reader keeps realizing the significance of this result.
- We are already familiar with fundamentals of electricity and magnetism being briefly reviewed in this paragraph.

6. After being produced this way, batteries can work at different temperatures.

7. This is the same as saying that these two figures have nothing in common.

8. There are different ways of showing the phase relationships between three voltages.

9. The crossing of the curves was not predicted.

10. There was one mistake in a formula having been created by a team of young scientists.

4.11. Analyze the –ing forms. State them as Gerunds or Verbal Nouns. Motivate your decision.

1. She insisted on my showing her the papers and explaining why I did not mention her name as the co-author.

2. He promised to send me the reading the moment he found it.

3. He lost his job through falling ill all the time.

4. After hours of hard work we were so exhausted that decided to go home without cleaning the table and saying ‘goodbye’.

5. Thinking about this strange situation kept her awake nearly two hours that night.

6. After being asked about our plan for the following month he changed the topic every time.

7. Now we can watch the changing of the substance while heating.

8. We found the solving of this problem too difficult to be easily devised.

9. They praised themselves for having finished the line of final experiments.

10. Enlarging the contact area of electrolytes means improving their charging.

4.12. Translate into English using Gerund forms or Verbal Nouns.

1. Какова цель вашего приезда сюда?

2. После сдачи тестов я поехал к своим родителям.

3. Я отложил отправку статьи: нужно проверить ее еще раз.

4. Нет никакой возможности найти эту книгу.

5. Он покинул зал, не дожидаясь окончания конференции.

6. Ее опыт работы с этими веществами пригодится в будущем.

7. Он не возражает, чтобы вы присутствовали на его опытах.

8. Мы сейчас заняты перепроверкой важных результатов.
9. Он настаивал на том, чтобы приборы были тщательно упакованы.
10. Их лаборатория была награждена за изобретение вещества, проводящего ионы.

4.13. Choose an appropriate –ing form of the verb.

1. (watch) another man working gives a lot of pleasure.
2. Such (do) can hardly be explained.
3. (improve) semiconductors technology allowed us to enlarge capacity of electronic devices.
4. These (happen) are remarkable.
5. (return) home after a day of hard work is very satisfying.
6. You can learn about current developments in electronics by (look through) this web-site.
7. By (use) of new electronic devices one can regulate electrical energy.
8. Despite intensive (grow) of functions of electrical devices, important problems in this field are still connected with (convert) of electrical energy.
9. Mankind is capable of (use) electrical energy in different forms, so this energy type is applied in various areas.
10. By (choose) semiconductors as the base for converters, scientists had no difficulty in (work) high conductivity.

4.14. Find information about a scientist that made a great contribution to the development of physics. Prepare a presentation following the plan:

- What is this person famous for?
- Which contribution did he/she make?
- Why is this discovery/invention important?
- Which advantages and opportunities for further research were there?

4.15. Formulate the role of a battery in our life. Is there anything that can replace it? Find information about the alternatives and fill the table. Share your ideas with your class.

An alternative	Where to use	How to use	Advantages	Disadvantages

MODULE II. INFORMATION TECHNOLOGIES

UNIT 5. WHAT IS A COMPUTER NETWORK?

Vocabulary

1. to cause emergence [kəʊz i'mɜ:dʒəns] – вызывать появление
2. communication environment [kə,mju:nɪ'keɪʃn ɪn'vaɪrənmənt] – коммуникационная среда
3. computer network [kəm'pjʊ:tə 'netwɜ:k] – компьютерная сеть
4. to consist of [kən'sɪst ɒv] – состоять из
5. data links ['deɪtə lɪŋks] – каналы связи, передачи данных
6. final devices [faɪnl dɪ'vaɪs] – конечные устройства
7. human activity ['hju:mən æk'tɪvɪtɪ] – человеческая деятельность
8. to interconnect ['ɪntəkə'nekt] – связывать, соединять
9. in relation to [ɪn rɪ'leɪʃn tu:] – по отношению к, относительно
10. node [nəʊd] – узел
11. to occur [ə'kɜ:] – происходить, иметь место
12. remote execution of programs [[rɪ'məʊt ɛksɪ'kju:ʃn ɒv 'prəʊgræmz] – удаленное выполнение программ
13. to represent [reprɪ'zent] – представлять
14. router ['ru:tər] – маршрутизатор
15. set (n) – набор, комплект; (v) устанавливать
16. technical point of view ['teknɪkəl pɔɪnt ɒv vju:] – техническая точка зрения
17. territorially dispersed [trɪ'tɔ:riəlɪ dɪ'spɜ:st] – территориально рассредоточенный
18. to transmit data [trænz'mɪt 'deɪtə] – передавать данные, информацию

5.1. Answer the questions.

- 1) What is a LAN?
- 2) What is a WAN?
- 3) What is a distributed system?

5.2. Read text below and match each paragraph with the appropriate summary:

- a) Network uses, past and present
- b) How distributed systems work
- c) Networks and the future
- d) What networks are and how they operate
- e) The growth of networks, past and present

Computer Networks

I. Computer networks link computers by communication lines and software protocols, allowing data to be exchanged rapidly and reliably. Traditionally, networks have been split between wide area networks (WANs) and local area networks (LANs). A WAN is a network connected over long-distance telephone lines, and a LAN is a localized network usually in one building or a group of buildings close together. The distinction, however, is becoming blurred. It is now possible to connect up LANs remotely over telephone links so that they look as though they are a single LAN.

II. Originally, networks were used to provide terminal access to another computer and to transfer files between computers. Today networks carry e-mail, provide access to public databases and bulletin boards, and are beginning to be used for distributed systems. Networks also allow users in one locality to share expensive resources, such as printers and disk-systems.

III. Distributed computer systems are built using networked computers that co-operate to perform tasks. In this environment each part of the networked system does what it is best at. The high-quality bit-mapped graphics screen of a personal computer or workstation provides a good user interface. The mainframe, on the other hand, can handle large numbers of queries and return the results to the users. In a distributed environment, a user might use his PC to make a query against a central database. The PC passes the query, written in a special language (e.g. Structured Query

Language – SQL), to the mainframe, which then parses the query, returning to the user only the data requested. The user might then use his PC to draw graphs based on the data. By passing back to the user's PC only the specific information requested, network traffic is reduced, if the whole file were transmitted, the PC would then have to perform the query itself, reducing the efficiency of both network and PC.

IV. In the 1980s, at (least 100,000 LANs were set up in laboratories and offices around the world. During the early part of this decade, synchronous orbit satellites lowered the price of long-distance telephone calls, enabling computer data and television signals to be distributed more cheaply around the world. Since then, fibre-optic cable has been installed on a large scale, enabling vast amounts of data to be transmitted at a very high speed using tight signals.

V. The impact of fibre optics will be considerably to reduce the price of network access. Global communication and computer networks will become more and more a part of professional and personal lives as the price of microcomputers and network access drops. At the same time, distributed computer networks should improve our work environments and technical abilities.

5.3. Answer the questions:

1. What is the distinction between WAN and LAN networks?
2. How do computer networks impact our lives?
3. What are the advantages of using of fibro optics?
4. Which opportunities can the use of the networks open?
5. Which part of the text tells about the application of optic fibre?
6. Which part of the text shows types of networks?

5.4. Skim the text and say which ideas are True, False or Not Mentioned:

1. A computer network facilitates communications and allows sharing of resources and information among interconnected devices.
2. Computer networks and the technologies needed to connect and communicate through and between them, continue to drive computer hardware, software, and peripherals industries.
3. A WAN is a localized network usually in one building or a group of buildings close together.

5.5. Choose the main idea of the text:

1. Without technology our life would be slow down.
2. Without computer we have many difficulties in our daily life for example in our offices, school, colleges and other big business or private forms.
3. Networks can change our lives.

5.6. Translate into Russian:

- 1) to link, to exchange data, to transfer files, to be best at something, to transfer, to provide, to perform, to parse, to reduce, to improve, to pass the query, to draw graphs.
- 2) telephone link, distributed systems, bit-mapped graphic screen, around the world, synchronous orbit satellites, long-distance telephone calls, on a large scale, rapid, reliable, distinction, terminal access, remote, bulletin board, fibre optics.

5.7. Translate into English:

1. соединять компьютеры линиями связи
2. протокол ПО
3. быстро и надежно обмениваться данными
4. сети разделились
5. районные сети
6. местные / локальные сети
7. телефонная связь
8. обеспечить доступ к терминалу
9. пересылать файлы
10. обеспечить доступ к ...
11. база данных общего пользования
12. доска объявлений
13. их начинают использовать для ...
14. распределенные системы
15. делиться

5.8. Match these words and phrases with their definitions.

1 protocol	a) Analyse the syntax of a string of input symbols
2 bulletin board	b) a teleconferencing system allowing users to read messages left by other users

3 user interface	c) agreement governing the procedures used to exchange information between co-operating computers
4 make a query	d) means of communication between a human user and a computer system
5 parse	e) taking place at exactly the same time as something else
6 synchronous	f) request a search

5.9. Match the synonyms:

unclear	conduct
to enable	overall
place	decrease
speed	vague
carry out	empower
to install	expense
cost	site
global	velocity
world-wide	mount
to reduce	universal

5.10. Match the opposites:

disparate	diminish
conflict	make worse
prevent	disjointed
tiny	similarity
increase	agreement
improve	global
connected	cause
distinction	comparable
local	put together
split	huge

5.10. Read the summary of the text “Computer Networks” below and fill in the gaps using the list of words given.

distinction, distributed systems, environments, fibre-optic, LANs parses, protocols, queries, screen handling, synchronous, workstations

Computer networks link computers locally or by external communication lines and software _____, allowing data to be exchanged rapidly and reliably. The _____ between local area and wide area networks is, however, becoming unclear. Networks are being used to perform increasingly diverse tasks, such as carrying e-mail, providing access to public databases, and for _____. Networks also allow users in one locality to share resources.

Distributed systems use networked computers. PCs or _____ provide the user _____. Mainframes process _____ and return the results to the users. A user at his PC might make a query against a central database. The PC passes the query, written in a special language, to the mainframe, which then _____ the query, returning to the user only the data requested. This allows both the network and the individual PC to operate efficiently.

In the 1980s, at least 100.000 _____ were set up world-wide. As _____ orbit satellites have lowered the price of long-distance telephone calls, data can be transmitted more cheaply. In addition, _____ cable has been installed on a large scale, enabling vast amounts of data to be transmitted at a very high speed using light signals. This will considerably reduce the price of network access, making global networks more and more a part of our professional and personal lives. Networks should also improve our work _____ and technical abilities.

5.12. Match the words with their definitions:

Protocol	a localized network usually in one building or a group of buildings close together.
WAN	a system which connects up to a number of computers and communication devices to enable messages and data to be passed between those devices.
LAN	describing the image displayed on a computer screen whereby each pixel corresponds to one or more bits in memory.

Bulletin board	data transmission using cable made of optical fibres instead of copper wire.
Network	an agreement that covers the procedure used to exchange information between cooperating entities.
Distributed system	a high-level language for writing routines to query relational database. Originally developed by IBM in 1973 it is now on ANSI standard.
Bit-mapped	a teleconferencing system that allows users to read messages left by previous users on a variety of topics. All users can see all messages, unlike e-mail where the message is private.
Structures Query Language (SQL)	a wide area network: a network connected over long-distance telephone lines.
Synchronous orbit satellite	the organization of processing whereby each process is free for process local data. The processes exchange information with each other over a network.
Fibre optics	a style of interaction between the user and the computer involving a graphics screen, icons and some form of pointing device such as a mouse.
Graphical (user) interface	a satellite that orbits the Earth at a controlled speed so that it maintains its position in relation to the Earth.

5.13. Fill in the blanks with prepositions where it is necessary.

1. A WAN is a network connected ... long-distance telephone lines
2. Traditionally networks have been split... wide area network and local area networks.
3. Networks were used to provide terminal access . . . another computer and to transfer files ... computers.
4. A user might use his PC to make a query ... central database.
5. The PC passes the query, written ... a special language... mainframe.
6. Fibre-optic cable has been installed ... a large scale, enabling vast amounts of data to be transmitted ... a very high speed.
7. Remote devices must communicate ... the central computer only.

5.14. Ask questions to the underlined words.

1. Networks allow users in one locality to share expensive resources.
2. Mainframe passes the query and returns to the user only the data requested.

3. The user might then use his PC to draw graphs based on the data.
4. In 1980s LANs were set up in laboratories and offices.
5. The impacts of fibre optics will considerably reduce the price of network access.
6. Professional installers can have each of your machines out of operation.

5.15. Correct the mistakes.

1. Since then fibre-optic cable was installed in a large scale.
2. Distributed computers system built using networked computers.
3. Traditionally, networks split between wide area networks and local area networks.
4. All access devices are linking directly with the central computer.

5.16. Translate into Russian.

1. Modern networks, allowing people to work together no matter where they are, are widely spread.
2. The Internet is the largest information network in the world, linking almost every country on the planet.
3. Fibre-optics technology appears to be the most effective way to link computers, enabling very rapid and reliable transmitting of vast amounts of data.
4. The new technologies reduce the price of network access, making global networks more and more parts of our professional and personal lives.
5. There are several ways of installing a LAN, each having it's own advantages.
6. In the next century it will be very difficult to find a computer not connected to some network.

5.17. Translate these sentences paying attention to the Infinitives.

1. Computer networks link computers by communication lines and software protocols, allowing data to be exchanged rapidly and reliably.
2. It is now possible to connect up LANs remotely over telephone links.
3. Originally, networks were used to provide terminal access to another computer and to transfer files between computers.
4. Today, networks carry e-mail, provide access to public databases and are beginning to be used for distributed systems.
5. Networks also allow users in one locality to share

expensive resources. 6. The mainframe can handle large numbers of queries and return the results to the users. 7. The user might then use his PC to draw graphs based on the data. 8. Synchronous orbit satellites lowered the price of long-distance telephone calls, enabling computer data and television signals to be distributed more cheaply around the world.

5.18. Translate into English.

1. Локальной сетью (LAN) называется сеть, расположенная на сравнительно небольшой территории.

2. Многие крупные сети, являющиеся объединением небольших локальных сетей и отдельных пользователей, называются глобальными (WAN).

3. Пользователь компьютера, работая в сети, может предоставить другим пользователям права доступа к своим папкам, принтеру и другим периферийным устройствам.

4. Основное назначение сети – совместное использование ресурсов и обеспечение связи между компьютерами, расположенными в офисе и за его пределами.

5. Персональные компьютеры, объединенные в сети, позволяют десяткам и сотням пользователей легко обмениваться информацией и одновременно получать доступ к общим базам данных.

6. Услуги электронной почты, будучи довольно недорогими, позволяют пользователям компьютеров с помощью обычной телефонной сети посылать текстовые сообщения и различные данные в другие города и страны и получать информацию из крупных баз данных.

UNIT 6. DEVELOPMENT OF COMPUTER NETWORKS

6.1. Read Text 1 and answer the questions:

1. What do computer networks represent?
2. What are terminals used for?
3. What is the main principle of first networks?
4. What are bridges and hubs for?

Text 1

Computer network is a complex of territorially dispersed computers interconnected by data links. Computer networks represent a complex of technical, program and information means. From a technical point of view a computer network is a system for transmitting data, consisting of a set of terminals and the communication environment. Terminals (workstations) are final devices at the ends of a computer network which send or receive information in relation to the other terminal. The communication environment serves for transmitting data between terminals, consists of channels (nodes).

From the beginning, computer networks were created by a principle: some computers with network adapters consistently connected by coaxial cable. Further development of computer networks began to occur on the principles of structuring. Each computer network consists of a set of interconnected parts – structures. Each separate structure represents some computers with network adapters, each of which is connected to the commutator by separate wire (twisted pair).

The connection of computer networks in various organizations caused emergence of a special equipment, for example, hubs (host united blocks), bridges, routers, concentrators, which are carrying out such interaction. When you connect your computer to the hub, a part of electronics of a network interface is in the computer, and a part of it is in the hub. Bridges and hubs are used to connect to your computer. Routers are used for the organization of traffic, they convert data from one format to another, and also organize a protection of information.

Three the most effective network services are provided for subscribers of a computer network:

- providing information on all areas of human activity;
- electronic communications: e-mail – transmission and reception of a text and graphic information; teleconferences – an exchange of information between participating users;
- a remote execution of programs: this is a service of the Internet, the user receives the unique name connecting to the network, and his computer becomes a network station.

6.2. Match the opposites.

A.

1. start	a) take away
2. deliver	b) support
3. dominate	c) fail
4. threaten	d) finish
5. introduce	e) exclude
6. produce	f) utilize

B.

1. current	a) peripheral
2. heavy	b) cheap
3. expensive	c) obsolete
4. enormous	d) small
5. international	e) easy
6. tiny	f) domestic
7. main	g) immense

6.3. Put the words in the sentences below:

obsolete	fails	deliver
enormous	exclude	immense
	take away	domestic
	support	current

1. Computer networks _____ a number of benefits to small and medium-sized enterprises.

2. A company that needs Computer Network _____ can always turn to firms that specialise in providing computer services.

3. All of the computers in an office building might become completely useless if a single network component _____.

4. Does managing your office computer or network _____ precious time _____ from actually running your business?

5. The CrashPlan app allows you to _____ network adapters and wireless networks from use by CrashPlan.

6. Will networking become _____ in the next 5 years?

7. The _____ growth of data in the last decades led to a wide variety of different database technologies.
8. _____ cybersecurity requires several federal roles and responsibilities.
9. A larger network could open up _____ possibilities.
10. Where can I find information about _____ research areas in computer networks?

6.4. Open the brackets. Use Gerund or Infinitive with or without “to”.

1. It's time _____ your hard drive and protect yourself from Internet threats.
2. _____ a small business computer network has become easier over the years as operating systems and networking technologies have improved.
3. "If I as a private citizen can _____ a network with far less income than a government, a country should be able to do it, too, no?"
4. You can _____ network computers with magic packet.
5. That new computer feeling is awesome, but there's the old one, sitting on the floor of your office, _____ space, seemingly useless.

6.5. Use the correct form of Participle I or Participle II (Passive or Active Voice, Indefinite or Perfect). Translate the sentences.

1. In the misuse detection techniques there is a knowledge database of **(to exist)** attacks.
2. It is the process of finding relationship between alerts and aggregates them in order to improve the quality of information while **(to reduce)** the number of alerts.
3. This information store is continuing to grow at a steadily **(to increase)** rate.
4. Possibly the oldest example of a network **(to cover)** large territories and serving multiple clients is the water-supply system.
5. Computer networks represent a particular case of distributed computing systems in which a group of computers operate in a coordinated manner to perform a set of interrelated tasks by **(to exchanging)** data in an automated mode.
6. Users would prepare punched cards **(to contain)** data and program code and then would transfer these cards to the computing center.
7. LSI devices were characterized by relatively low cost and **(to advance)** functional capabilities.

8. End users were no longer satisfied with **(to isolate)** work on a standalone computer.

9. All problems **(to relate)** to packet loss are delegated to specific software modules of higher levels, which are not directly integrated into Frame Relay and ATM networks.

10. For transmitting service messages packet-switching methods are used that are similar to the protocols **(to employ)** in computer networks.

11. Usually, LANs provide a range of services **(to implement)** online.

12. A computer network **(to alter)** characteristics would employ fuzzy sets with different domain ranges and a different neural network.

13. This will not prevent any generalized conclusions from **(to develop)** since the network dependencies involved are consistent between networks.

14. This routing node is the one that will control the routing algorithm **(to study)**.

15. The remaining information referred to characteristics of the specific link **(to chose)** from node one.

16. If a routing algorithm such as shortest route was employed, a heavy bias toward “distance” would be present in the data **(to collect)**.

17. The simulation model was designed to support necessary adjustments to the computer network **(to model)**.

18. These two factors were chosen because we expected them to be the most significant of the four measures **(to use)**.

19. The paucity of so-called stable networks **(to use)** today emphasizes the usefulness of this new algorithm.

6.6. Open the brackets using the right form of the verb.

1. What a mess! Your office needs ____ (tidy up).

2. ____ (plan) your work for next month you should take this into consideration.

3. I have no experience ____ (run) personnel.

4. ____ (try) all the keys on the ring she finally found the right one.

5. He insisted ____ the matter (submit) for Arbitration.

6. We're looking forward ____ (establish) good business relations with your company.

7. ____ (explore) the problem thoroughly the experts made the conclusion.

8. He went to the pub ____ (go) to the formal dinner.

9. You ought to give up ____ (drink) too much coffee during the business hours.

10. He objects ____ the meeting (fix) for Monday. (fix – зд. назначать)

6.7. Answer the questions:

- 1) What do you know about Sergey Brin?
- 2) Do you use Google to search information?

6.8. Read Text 2 and mark the following statements T (True), F (False) or N (Not mentioned).

- 1) Sergey Brin was born in biologists' family.
- 2) Sergey Brin immigrated to the United States when he was six.
- 3) Larry Page is older than Sergey Brin.
- 4) Larry Page and Sergey Brin developed Google in 1997.
- 5) Googol is a one with thousand zeros.
- 6) In 2006, Google purchased YouTube.
- 7) Sergey Brin is the richest native of Russia.

Text 2

Sergey Brin was born on August 21, 1973, in Moscow, in the Soviet Union, to Russian Jewish parents, Mikhail and Yevgenia Brin, both graduates of Moscow State University. His father is a mathematics professor at the University of Maryland, and his mother a researcher at NASA.

In 1979, when Brin was six years old, his family felt compelled to emigrate to the United States. After receiving his degree in mathematics and computer science from the University of Maryland at College Park, Brin entered Stanford University, where he met Larry Page. Both students were completing doctorates in computer science.

As a research project at Stanford University, Brin and Page created a search engine that listed results according to the popularity of the pages, after concluding that the most popular result would often be the most useful. They called the search engine Google after the mathematical term "googol," which is a 1 followed by 100 zeros, to reflect their mission to organize the immense amount of information available on the Web.

After raising \$1 million from family, friends and other investors, the pair launched the company in 1997. Headquartered in the heart of California's Silicon Valley, Google held its initial public offering in August

2004, making Brin and Page billionaires. Google has since become the world's most popular search engine, receiving an average of 5.9 billion searches per day in 2013.

In 2006, Google purchased the most popular website for user-submitted streaming videos, YouTube, for \$1.65 billion in stock. On August 10, 2015, Brin and Page announced that Google and its divisions were being restructured under the auspices of a new parent company called Alphabet, with Brin and Page serving as Alphabet's respective president and CEO.

6.9. Make words by adding prefixes and suffixes to the base.

Model: human – humanity, inhuman, inhumanity

possible	use
polite	like
stress	taste
thought	understand
agree	hope

6.10. Translate into English.

1) Каждую минуту на сервисе YouTube появляется около ста часов новых видеоматериалов. Чтобы посмотреть все фильмы, которые добавили на этот сайт только в течение одного дня, вам понадобится более шестнадцати лет.

2) Самолеты – удобный и безопасный транспорт, поэтому большинство путешественников отдают предпочтение именно им.

3) С момента появления первых компьютеров прошло много времени, а в процессе развития этой технологии происходило множество интересных событий.

4) Самый первый в мире смартфон появился двадцать лет спустя с момента разработки мобильного телефона, то есть в 1993 году и был представлен всеобщему вниманию на конференции в городе Флорида.

5) Первая веб-камера была протестирована в компьютерной лаборатории Кембриджского университета. Ее единственной целью было контролирование отдельной кофеварки, и предупреждение о заканчивающемся кофе.

6.11. Work in pairs. Discuss information you usually look for on the Internet and the search engine you use.

6.12. Replace the following complex sentences with simple sentences with Complex Object.

1. I would like to see how he would say it to my face 2. I expect that you will join our excursion. 3. We had not expected that she would reply, but she did. 4. We knew that he was a clever man. 5. I don't like it that you repeat this nonsense. 6. I hate it when people speak so cynically. 7. We expect that everybody will be ready by seven. 8. They showed themselves even more narrow-minded than we had expected they would be. 9. I felt that somebody touched me lightly on the shoulder.

6.13. Use the Infinitive or Gerund forms of the verbs in brackets.

1. She doesn't allow ... in the house. (smoke)
2. I've never been to Iceland but I'd like ... there. (go)
3. I'm in a difficult position. What do you advise me ...? (do)
4. She said the letter was personal and wouldn't let me ...it. (read)
5. We were kept at the police station for two hours and then we were allowed...(go)
6. Where would you recommend me ... for my holidays? (go)
7. I wouldn't recommend ... in that restaurant. The food is awful. (eat)
8. The film was very sad. It made me ... (cry)
9. Carol's parents always encouraged her ... hard at school. (study)

6.14. Choose a topic and give a speech (3-5 minutes).

1. Network users, past and present.
2. How distributed systems work.
3. Networks and the future.
4. What networks are and how they operate

UNIT 7. HIGH-LEVEL LANGUAGES

Vocabulary

1. to allow [ə'laʊ] – позволять
2. auspices ['ɔ: .spi .siz] – эгида
3. complicated ['kɒplikeɪtɪd] – сложный
4. to consist of [kən'sɪst ɒv] – состоять из

5. to deduce [di'dju:s] – выводить
6. execution [eksɪ'kju:ʃn] – выполнение
7. to feel compelled [tə fi:l kəm'peld] – быть вынужденным
8. in essence [in esns] – по существу
9. headquarters [hed'kwɔ:.təz] – штаб-квартира
10. hierarchie ['haɪərə:ki] – иерархия
11. to inherit [in'herit] – наследовать
12. to require [rɪ'kwaɪə] – требовать
13. rigorous ['rɪgərəs] – тщательный
14. outgrowth ['aʊtgrəʊθ] – нарост
15. threat [θret] – рассматривать
16. variable ['vɛəriəbl] – переменная

7.1. Read the text.

Classification of High-level Languages

High-level languages are commonly classified as procedure-oriented, functional, object-oriented, or logic languages. The most common high-level languages today are procedure-oriented languages. In these languages, one or more related blocks of statements that perform some complete function are grouped together into a procedure. In essence, a procedure is just a mini-program. A large program can be constructed by grouping together procedures that perform different tasks. Procedural languages require the programmer to design each procedure to be general enough to be used in different situations.

Functional languages treat procedures like mathematical functions and allow them to be processed like any other data in a program. This allows a much higher and more rigorous level of program construction. Functional languages also allow variables—symbols for data that can be specified and changed by the user as the program is running—to be given values only once.

Object-oriented languages are outgrowths of functional languages. The code used to write the program and the data are grouped together into units called objects. Objects are further grouped into classes, which define the attributes objects must have. A simple example of a class is the class Book. Objects within this class might be Novel and Short Story. Classes of objects can also be further grouped into hierarchies, in which objects of one class can inherit methods from another class. The structure provided in such languages makes them very useful for complicated programming tasks.

Logic languages use logic as their mathematical base. A logic program consists of sets of facts and if-then rules, which specify how one set of facts may be deduced from others, for example:

If the statement X is true, then the statement Y is false.

In the execution of such a program, an input statement can be logically deduced from other statements in the program. Many artificial intelligence programs are written in such languages.

7.2. Answer the following questions:

1. What is classification of high-level languages?
2. What are the most common high-level languages?
3. In what way can a large program be constructed?
4. What do functional languages allow variables?
5. What does a logic program consist of?
6. What languages are used to write artificial intelligence programs?

7.3. State whether the following information is True, False or Not Mentioned in the text?

1. A procedure is just a mini-program.
2. In computer science, a high-level programming language is a programming language with strong abstraction from the details of the computer.
3. Functional languages treat procedures like mathematical functions and allow them to be processed like any other data in a program.
4. Object-oriented languages are outgrowths of logic languages.
5. Examples of popular high-level programming languages today may include Python, Visual Basic, Delphi, Perl, PHP, ECMAScript, Ruby and many others.
6. Classes of objects can also be grouped into hierarchies.
7. In the 1960s, high-level programming languages using a compiler were commonly called autocodes.

7.4. Match the words with their definitions:

1. outgrowth	a) to have qualities, physical features, etc. that are similar to those of your parents, grandparents, etc.
2. complicated	b) the act of doing a piece of work, performing a duty, or putting a plan into action
3. deduce	c) to be formed from the people or things mentioned
4. hierarchy	d) often changing; likely to change
5. inherit	
6. consist of	

7. execution 8. variable	e) a thing that grows out of something else f) to form an opinion about something based on the information or evidence that is available g) a system, especially in a society or an organization, in which people are organized into different levels of importance from highest to lowest h) made of many different things or parts that are connected; difficult to understand
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7.5. Fill in the gaps in the sentences with the words given:

inherit	complicated	variables	treat	require	consists
		deduce	allow		

1. The language designers may treat the library as a separate entity from the language.
2. Classes of objects can inherit features from other classes of objects.
3. High level languages allow users to write in a notation which is familiar to them.
4. High-level languages deal with variables, arrays, objects and other abstract computer science concepts.
5. "High" in the name 'high level language' doesn't mean that it is more complicated.
6. High-level language doesn't require addressing hardware constraints to a greater extent when developing a program.
7. The only language computer hardware can understand is binary code which consists of 1s and 0s.
8. It must be possible to deduce the logical behaviour of any particular program.

7.6. Match the words with similar meanings:

- A) investigation, rapidly, shape, immense, to expand, speed, to examine, to receive, to apply, significance, efficient;
- B) importance, research, to use, effective, to get, to study, velocity, to extend, form, fast, tremendous.

7.7. Translate the sentences paying attention to the Infinitives.

1. While solving problems using high-level languages, importance was given to develop an algorithm.

2. Masters level has been designed to examine the candidates ability to understand and produce language in a variety of styles.

3. This exact set of arguments applies to why high-level programming languages must be considered too low-level.

4. What is the most efficient way to learn a new programming language?

5. Programming languages were developed to speed this process up and allow more people to become programmers.

6. A tremendous savings can be obtained by designing computer hardware that is oriented to aiding the programmer rather than to simplifying the computer designer's job.

7. At runtime, extensible programming systems must permit languages to extend the set of operations that it permits.

8. Antha is a high-level language for biology, making it easy to rapidly compose reproducible work flows using individually testable and reusable Antha Elements.

UNIT 8. CRYPTOGRAPHY

Vocabulary

1. derived [dɪ'raɪvd] – производные

2. to ensure [ɪn'ʃʊə] – обеспечивать

3. substitution [sʌbstɪ'tjuːʃn] – замена

4. to retain [rɪ'teɪn] – сохранить

5. permutation [pɜːmjə'teɪʃn] – перестановка

6. implementation [ɪmplɪmen'teɪʃn] – реализация

7. to decrypt [dɪ'krɪpt] – расшифровать

8. to scramble [skræmbl] – карабкаться, здесь: шифровать

8.1. Answer the questions. Read the text below and check your answers.

1. What is cryptography used for?

2. What is it divided into?

3. In what way are the letters in a message rearranged?

4. What do the sender and receiver agree upon before decoding a message using transposition?

5. When was the type of substitution technique documented?
6. What is the most common assymetric cryptographic technique on the Internet today?
7. What was it based upon?

The Main Techniques of Cryptography

Cryptography is a technique used to hide the meaning of a message and is derived from the Greek word *kryptos* (hidden). This is different from steganographic techniques in that one is not hiding the actual message, only the meaning of the message. If a message were to fall into the hands of the wrong person, cryptography should ensure that that message could not be read. Typically the sender and receiver agree upon a message scrambling protocol beforehand and agree upon methods for encrypting and decrypting messages. Cryptography is further divided into two implementation techniques and those include transposition and substitution.

Transposition is a cryptographic technique whereby the letters in a message are rearranged to provide secrecy. Think of the word dog and all of the ways one could arrange the letters -- dog, dgo, odg, ogd, dgo, odg -- this anagram is a simple example of transposition. The position of the original letters all retain their identities but change their original positions. As you increase the size of the message to over 40 letters however, the number of permutations grow exponentially and it becomes very difficult to decrypt such a communication. Typically the sender and receiver agree upon a technique to encode and decode messages using transposition.

Substitution is a cryptographic technique where each letter of the plaintext message is replaced by a different letter. Each letter retains its original position in the message text, but the identity of the letter is changed. This type of technique was documented during Julius Caesar's Gallic Wars.

Simple Substitution Cipher A B C D E (Plain Alphabet), D C E G H (Cipher Alphabet).

If one were to send the message 'BAD' to someone using this simple cipher, the encrypted message text would read 'CDG'.

The most common assymetric cryptographic technique on the internet today is RSA. It was created by Rivest, Shamir, and Adleman at Harvard University and was based upon the research of Whitfield Diffie and Martin Hellman.

8.2 Choose synonyms to the word in *italics*:

substitution – a) betrayal b) replacement c) reason d) installation

derive – a) obtain b) produce c) earn d) avoid

decrypt – a) work out b) comprehend c) completed d) decode

retain – a) maintain b) continue c) keep d) command

implementation – a) fulfillment b) power c) influence d) reaction

ensure – a) deposit b) settle c) secure d) guarantee

permutation – a) regulation b) rearrangement c) instruction d) statement

scramble – a) climb b) creep c) squeeze d) blackmail

8.3. Fill the gaps with the correct adjective:

Probable	1. Cryptography prior to the modern age was effectively synonymous with encryption, the conversion of information from a ... state to apparent nonsense.
Unbreakable	2. Essentially all ciphers remained ... to cryptanalysis using the frequency analysis technique until the development of the polyalphabetic cipher.
Noticeable	3. Computers allowed for the encryption of any kind of data ... in any binary format.
Readable	4. As well as being aware of cryptographic history, cryptographic algorithm and system designers must also sensibly consider ... future developments while working on their designs.
Valuable	5. Many block ciphers have been designed and released, with ... variation in quality.
Programmable	6. The one-time-pad remains the only theoretically ... cipher.
Vulnerable	7. An attacker might also study the pattern and length of messages to derive ... information.
Considerable	8. This had a ... impact on the cryptography research community.
Representable	9. However, as the Internet grew and computers became more widely ..., high-quality encryption techniques became well known around the globe.
Probable	10. Cryptanalytic efforts at Bletchley Park during WWII culminated in the development of the Colossus, the world's first fully electronic, digital, programmable computer.

8.4. Match the beginning and the end of the sentences:

1. It is possible to combine Cryptography and Steganography together...	a) ...and insert the dot as a "period" in some unsuspecting letter or text for secret communications.
2. During WW II, the Germans would scramble messages and then shrink the text down to a tiny dot...	b) ...used to compose the original message.
3. One of the first cryptographic devices using transposition dates back...	c) ...to achieve a higher level of security.
4. Plain Text refers to the human readable alphabet...	d) ...specifies the details of that particular encryption.
5. Cipher Text refers to the encrypted plaintext message once the original letters...	e) ...to the fifth century and was named the Spartan Scytale.
6. An Algorithm is a general method of encryption and a Key...	f) ...in the 1970's while working at IBM.
7. Lucifer was a symmetric encryption algorithm created by Horst Feistel...	g) ...in the message have been substituted with the cipher alphabet.

8.5. Use Passive form of the verb in brackets:

1. A secrecy technique where the existence of an actual message (to hide).
2. The word (to derive) from the Greek words “steganos” – covered and “graphein” – to write.
3. Steganography is ancient technique that (to use) for thousands of years as a primitive for secrecy systems and secret communications.
4. In the first century, Pliny the Elder described how the milk from a thitymallus plant (can, to use) as invisible ink.
5. The technique primarily achieves security through obscurity and its basic weakness is that if the message (to discover), the secret communication (to reveal).
6. The Scytale worked as follows – a fabric (to wrap) around a staff and a message (to write) on the cloth.
7. This type of technique (to document) during Julius Caesar's Gallic Wars.
8. It (to name) for Julius Caesar who employed the technique to secure military communications.

9. If you think about RSA or 3DES, the encryption algorithms well (to know) and (to advertise) and the keys (to be the only unknown) element of the system.

10. This idea (to incorporate) later into RSA named after Rivest, Shamir, and Adleman and is a common cryptographic technique on the Internet today.

8.6. Fill the gaps with the modal verb:

1. For example the letter «E» ... has a frequency of 12% for most communications.

2. The strength of the cipher lies in the fact that a single letter ... be represented in several different ways.

3. Combining these two primitives ... both hide the meaning of a message as well as conceal the physical message.

4. Auguste Kerckhoffs was a military cryptologist, who proposed that the one ... assume that the encryption algorithms ... be open and transparent.

5. An attacker ... also study the pattern and length of messages to derive valuable information.

6. In public-key cryptosystems, the public key ... be freely distributed, while its paired private key must remain secret.

7. Each distinct pair of communicating parties ..., ideally, shares a different key.

8. Finally, in a chosen-ciphertext attack, the cryptanalyst ... be able to choose ciphertexts and learn their corresponding plaintexts.

9. The earliest forms of secret writing required little more than writing implements since most people ... not read.

10. Alberti's innovation ... to use different ciphers (i.e., substitution alphabets) for various parts of a message.

8.7. Translate the Russian phrases into English:

– Что обозначает слово «энигма»?

– It comes from Greek and it means “riddle”, “mystery”.

– Интересно, когда она была изобретена?

– It was Germany's main cryptographic technology during WW II. Enigma was invented by Arthur Scherbius.

– Что послужило причиной её появления?

– Following the decryption of the Zimmerman note during World War I and the effects that weak ciphers had on the war's outcome, Germany was

looking for "the unbreakable cipher" and was interested in automation and the use of machinery to replace traditional paper and pencil techniques.

- Из чего она состояла?

- The Enigma machine consisted of a basic keyboard, a display that would reveal the cipher text letter, and a scrambling mechanism such that each plain text letter entered as input via the keyboard was transcribed to its corresponding cipher text letter.

- Что было необходимо, чтобы расшифровать текст?

- To decipher a message, the receiver require a code book (shared by both the sender and receiver) detailing all the specific scrambler settings for the day and would also have an identical enigma machine.

- Что потом произошло с машиной?

- Breaking Enigma was crucial to ending World War II and it was eventually broken due in large part to the work of Marian Rejewski, a polish statistician, mathematician, and code breaker. Although Rejewski never broke the Enigma, he transferred all his research to the English and the French before Germany invaded Poland.

- Я слышал, что эта машина как-то связана с именем Алана Тюрнга.

Eventually, Alan Turing and the code breakers at Bletchley used Rejewski's work to build Bombes which were electromechanical machines that were designed specifically to break Enigma.

8.8. Read and retell the text below.

The Importance of Computer Security

The level of security of information processed in systems and at the objects of information infrastructure is determined by a block of its features including three following:

- confidentiality – property of information to be protected from unauthorized access;

- integrity – property of information to be protected from unauthorized alteration, deletion or deterioration;

- availability – property of information to be protected from unauthorized suppression.

In 2003, 94 % of British companies reported security incidents related to computer security. 91 % of these cases were intentional. As Financial Times

reported, such information was given in information security report brought by British Chamber of Commerce and Industry. For the last four years a three-fold growth of total number of incidents was noted in this field. Rapid development of the Internet that has brought Britain to the second place by density of the Internet users, has also brought significant risks alongside. The average size of damage caused by serious computer security incidents amounted to GBP 10,000. This sum reached GBP 120,000 for huge corporations. One firm reportedly incurred a GBP 250,000 loss due to confidential information theft.

Thefts and counterfeits of credit cards turned into a real disaster. Companies, especially banks, try to conceal incidents of computer theft as they fear that consumers, partners, depositors, shareholders would lose faith in their brand names if they were exposed as compromised. That's why scales of losses reported in the official statistics are negligibly registered.

Counterespionage and industrial espionage also develop at a quick pace. Special services were formed to cooperate in this field with governmental intelligence; American Society for Industrial Security was even created.

8.9. Choose a topic and prepare a monologue:

1. Cryptography and network security
2. Cryptography engineering design principles and practical applications
3. History of cryptography and cryptanalysis
4. Types of Modern cryptography
5. Cryptanalysis
6. Cryptographic primitives
7. Cryptosystems

UNIT 9. HACKING

Vocabulary

1. access ['ækses] – доступ
2. as applied to [æz ə'plaid] – применительно к
3. authority [ɔ:'θɔ:riti] – власть, власти
4. awe-inspiring ['ɔ: inspraɪɪŋ] – повергающий в трепет, волнующий
5. bogus ['bəʊgəs] – поддельный, фальшивый

6. bonafide [ˌbəʊnə ˈfaɪdi] – истинный, настоящий
7. to break into [breɪk ˈɪntu] – взламывать
8. burglar [ˈbɜːglə] – взломщик, грабитель
9. to cringe [krɪndʒ] – съёживаться
10. to encompass [ɪnˈkʌmpəs] – окружать, обобщать
11. endeavor [ɪnˈdevə] – попытка, стремление
12. exhilaration [ɪgzɪləˈreɪʃn] – веселость, радостное настроение, приятное возбуждение
13. to exploit [ˈeksplɔɪt] – использовать
14. hack [hæk] – (n) курьез, забава; (v) забавляться (при работе с машиной); изучать, осваивать, влезать (в тонкости программы, системы)
15. insight [ˈɪnsaɪt] – осмысление, понимание; способность проникновения в суть
16. to juggle [dʒʌɡl] – жонглировать
17. laudatory [ˈləʊdətəri] – хвалебный
18. mainframe [ˈmeɪnfreɪm] – компьютер общего пользования
19. to meet the demands [miːt ðiː dɪˈmɑːnd] – соответствовать требованиям
20. to be prolific in / of [prəʊˈlɪfɪk] – изобиловать
21. punishment [ˈpʌnɪʃmənt] – наказание
22. purpose [ˈpɜːpəs] – цель
23. to reap rewards [riːp rɪˈwɔːdz] – пожинаать плоды
24. recent [riːsnt] – недавний
25. reign [reɪn] – власть
26. to stand for [stænd] – подразумевать, обозначать
27. substantial [səbˈstænʃəl] – существенный
28. to succeed in [səkˈsiːd] – преуспевать в
29. survival [səˈvaɪvəl] – выживание
30. to take a step [teɪk ə step] – делать шаг
31. time sharing [taɪm ˈʃeərɪŋ] – разделение времени
32. transcendental meditation [trænsenˈdentl mediˈteɪʃn] – трансцендентальная медитация
33. undetected [ʌndɪˈtektɪd] – незамеченный
34. victim [ˈvɪktɪm] – жертва

9.1. Answer the questions:

1. Why information protection is important nowadays?
2. What do you know about the statistics of Stanford Research Institute study of computer abuse?
3. Why does company give good recommendations to the criminals?
4. Are hackers good or bad?
5. What examples of computer abuse (неправильное употребление, использование) do you know?
6. What are the reasons for computer crime?

9.2. Read the text and complete the task below:

A Real Disaster

More and more the operations of our businesses, governments, and financial institutions are controlled by information that exists only inside computer memories. Anyone clever enough to modify this information for his own purposes can reap substantial rewards. Even worse, a number of people who have done this and been caught at it have managed to get away without punishment.

These facts have not been lost on criminals or would-be criminals. A recent Stanford Research Institute study of computer abuse was based on 160 case histories, which probably are just the proverbial tip of the iceberg. After all, we only know about the unsuccessful crimes. How many successful ones have gone undetected is anybody's guess. Moreover, if the crime is detected, the criminal may walk away not only unpunished but with a glowing recommendation from his former employers.

Of course, we have no statistics on crimes that go undetected. But it's unsettling to note how many of the crimes we do know about were detected by accident, not by systematic audits or other security procedures. The computer criminals who have been caught may have been the victims of uncommonly bad luck.

Unlike other embezzlers, who must leave the country, commit suicide, or go to jail, computer criminals sometimes brazen it out, demanding not only that they not be prosecuted but also that they be given good recommendations and perhaps other benefits. All too often, their demands have been met.

Why? Because company executives are afraid of the bad publicity that would result if the public found out that their computer had been misused. They cringe at the thought of a criminal boasting in open court of how he juggled the most confidential records right under the noses of the company's executives, accountants, and security staff. And so another computer criminal departs with just the recommendations he needs to continue his exploits elsewhere.

Mark each statement as True or False:

1. A person is innocent until proven guilty.
2. Computer-related crime has diminished.
3. A thief can transfer funds from other people's accounts.
4. Dishonest employees can't ship the company's products to addresses of their choosing.
5. It is impossible to counterfeit credit cards.
6. Phone freaks can be found out.
7. Personal information should not be stored in computer files.
8. A real bank checks very carefully before handling out any money.
9. Unauthorized persons have proved to be inefficient laymen (дилетанты).
10. Hardware is less expensive than software.
11. Computer criminals will never be caught.
12. Companies don't punish some criminals because they don't want bad publicity.

9.3. Match the equivalents:

A

- 1 избежать наказания
- 2 потенциальные преступники
- 3 злоупотребление компьютером
- 4 пресловутая верхушка айсберга
- 5 остаться не обнаруженным
- 6 можно только догадываться
- 7 хранить счета
- 8 переводить по желанию

B

- a. proverbial tip of the iceberg
- b. computer abuse
- c. go undetected
- d. to get away without punishment
- e. keep accounts
- f. transfer (funds) at will
- g. would-be criminal
- h. is anybody's guess

9.4. Match the words with the definitions:

1. Government	a) activities that involve breaking the law
2. Purpose	b) detect something to discover or notice something, especially something that is not easy to see, hear
3. Crime	c) to use something well in order to gain as much from it as possible
4. Victim	d) the group of people who are responsible for controlling a country or a state
5. Exploit	e) a person who has been attacked, injured or killed as the result of a crime, a disease, an accident
6. Detect	f) the intention, aim or function of something; the thing that something is supposed to achieve

9.5. Find in the text “A Real Disaster” English equivalents to:

Наказание; хуже того; пожинать богатые плоды; излишество; остаться незамеченными; пресловутая верхушка; работодатель; тревожный; преследовать; совершить самоубийство; мошенник; пойти в тюрьму; соответствовать требованиям.

9.6. Give synonyms to the words from the text. Use the dictionary if necessary.

To come to light; confidential; attempt; crooked; to deliver; to perpetrate crime; freaks; to avoid; to obtain; to reveal; merchandise; transaction; severance pay; publicity; executive.

9.7. Study the meaning of the following idioms and word combinations:

1. **fit for purpose** – (of an institution, a system, a thing, etc.) suitable for the function or purpose that it was designed for;

2. **for (all) practical purposes** – used when you are stating what the reality of a situation is on purpose;

3. **on purpose** – not by accident; deliberately;

4. **to all intents and purposes** (British English) – in the effects that something has, if not in reality; almost completely (North American

English); in the effects that something has, if not in reality; almost completely;

5. **to little/no purpose** - (formal) with little/no useful effect or result.

9.8. Use the word combinations above to complete the sentences:

- a). He did it, knowing it would annoy her.
- b). By 1981 the docks had, ..., closed.
- c). I returned the goods as they weren't ...
- d). There's still another ten minutes of the game to go, but ... it's already over.
- e). The government had spent a lot on education but ...
- f). The two items are, ..., identical.
- g). The new executive flats are fully equipped and ...
- h). The minister argued that the education system wasn't ...

9.9. Read the text "The First Hackers" and find out if these statements correspond to the content of the text:

1. The first hackers were interested in railroad circuitry.
2. The first hackers studied at MIT.
3. TMRC stands for Toy Machinery Railroad Car.
4. Hackers had their own Ethic Code.
5. Hackers sabotaged the work of the AI Lab.
6. An elegant computer was, to a real hacker, awe-inspiring.
7. At AI Lab hackers wrote a computer program for every other task.
8. Hackers were quite prolific of innovations.
9. Hackers were given free reign on the two AI Lab professors.

The First Hackers

The first "hackers" were students at the Massachusetts Institute of Technology (MIT) who belonged to the TMRC (Tech Model Railroad Club). Some of the members really built model trains. But many were more interested in the wires and circuits underneath the track platform. Spending hours at TMRC creating better circuitry was called "a mere hack." Those members who were interested in creating innovative, stylistic, and technically clever circuits called themselves (with pride) hackers.

During the spring of 1959, a new course was offered at MIT, a freshman programming class. Soon the hackers of the railroad club were spending days, hours, and nights hacking away at their computer, an IBM 704.

Instead of creating a better circuit, their hack became creating faster, more efficient program with the least number of lines of code. Eventually they formed a group and created the first set of hacker's rules, called the "Hacker's Ethic".

Rule 1: Access to computers and anything, which might teach you, something about the way the world works - should be unlimited and total.

Rule 2: All information should be free.

Rule 3: Mistrust authority – promote decentralization.

Rule 4: Hackers should be judged by their hacking, not bogus criteria such as degrees, race, or position.

Rule 5: You can create art and beauty on a computer.

Rule 6: Computers can change your life for the better.

These rules made programming at MIT's Artificial Intelligence Laboratory a challenging, all encompassing endeavor. Just for the exhilaration of programming, students in the AI Lab would write a new program to perform even the smallest tasks. The program would be made available to others who would try to perform the same task with fewer instructions. The act of making the computer work more elegantly was awe-inspiring.

Hackers were given free reign on the computer by two AI Lab professors, "Uncle" John McCarthy and Marvin Minsky, who realized that hacking created new insights. Over the years, the AI Lab created many innovations: LIFE, a game about survival; LISP, a new kind of programming language; the first computer chess game; The CAVE, the first computer adventure; and SPACEWAR, the first video game.

9.10. Answer the questions:

1. Who were the first hackers?
2. What did they do?
3. What was their aim?
4. What did their activities result in?

9.11. Translate the Hacker's rules and summarize the first hackers' credo. Are these statements True or False?

1. A person is innocent until proven guilty.
2. Computer-related crime has diminished.
3. A thief can transfer funds from other people's accounts.
4. Dishonest employees can't ship the company's products to addresses of their choosing.

5. It is impossible to counterfeit credit cards.
6. Phone freaks can be found out.
7. Personal information should not be stored in computer files.
8. A real bank checks very carefully before handling out any money.
9. Unauthorized persons have proved to be inefficient laymen (дилетанты).
10. Hardware is less expensive than software.
11. Computer criminals will never be caught.
12. Companies don't punish some criminals because they don't want bad publicity.
13. Those who can, do. Those who cannot, teach. Those who cannot teach, HACK!
14. The first hackers were quite different from the modern ones.

9.12. Find the odd word in each line:

Authority – power – ascendancy – might
 Bogus – counterfeit – true – faked
 Encompass – embrace – comprise – install
 Endeavor – attempt – effort – inspiration
 Exhilaration – excitation – excitement – desire
 Bona fide – real – false – legal
 Awe-inspiring – impressive – magnificent – dreadful
 Insight – understanding – comprehension – consciousness

9.13. Fill the gaps with the words below:

programming, insights, innovation, ethic, instructions, exhilaration, endeavor, awe-inspiring, encompass, freshmen, authority, bogus, mistrust.

1. Decentralization results in ... to the chief.
2. Holding the door for a lady is the question of...
3. This still life isn't Picasso's; it's a...
4. The report you've presented doesn't ... some of the problems.
5. If you can survive both in the jungle and the desert, a ... Indian you are.
6. The ... in how hardware works is obligatory for a good programmer.
7. Each ... is another step to a new technological revolution.
8. In 1961 the Soviet Scientists'... to conquer the space was a success.
9. ... without any reason proves one's carelessness.

10. Iron grip boss expects you to carry out all his ...
11. Annually MIT gains over 5000 ...
12. ... should cause ... terror in your heart.

9.14. Put the verb in the correct tense:

1. One of the legends (to say) that hackers (to change) under the influence of "crackers" – the people who (to love) to talk on the phone at somebody else's expense. 2. Those people (to hook) up to any number and enjoyed the pleasure of telephone conversation, leaving the most fun – bills – for the victim. 3. Another legend (to tell) us that modern hackers (to be born) when a new computer game concept (to invent). 4. Rules (to be) very simple: two computer programs (to fight) for the reign on the computer. 5. Memory, disk-space and CPU time (to be) the battlefield. 6. The results of that game (to be) two in number and (to be) well known: hackers and computer viruses. 7. One more story (to tell) that the "new" hackers (to come) to existence when two MIT students that (to attend) the AI Lab found an error in a network program. 8. They (to let) people, responsible for the network, know but with no result. 9. The offended (to write) a code that completely (to paralyze) the network and only after that the error (to be fixed). 10. By the way, those students (to found) The Motorola Company later.

9.15. Translate into English:

I. Слово «хакер» совмещает в себе, по крайней мере, два значения: одно – окрашенное негативно (взломщик), другое – нейтральное или даже хвалебное (ас, мастер). Английский глагол *to hack* применительно к компьютерам может означать две вещи – взломать систему или починить ее. У этих действий есть общая основа: понимание того, как устроен компьютер, и программы, которые на нем работают.

II. В 1984 году Стивен Леви в своей знаменитой книге «Хакеры: Герои компьютерной революции» говорит о трех поколениях хакеров. Первое возникло в шестидесятых годах – начале семидесятых на отделениях компьютерных наук в университетах. Используя технику разделения времени, эти парни преобразовали компьютеры общего пользования в виртуальные персональные компьютеры.

III. В конце 70-х второе поколение делает следующий шаг – изобретение и производство персональных компьютеров. Эти неакадемические хакеры были яркими представителями контркультуры. Например, Стив Джобс, хиппи-битломан, бросивший колледж, или Стив Возняк, инженер в «Hewlett-Packard». Прежде чем преуспеть в «Apple», оба Стива занимались тем, что собирали и продавали так называемые голубые коробки – приспособления, позволяющие бесплатно звонить по телефону. Руководствуясь той же хакерской этикой, что и предыдущие поколения, они противостоят коммерциализации Internet, создавая программы, которые тут же становятся доступны всякому, кто их пожелает, – так называемые free-ware или shareware.

IV. Третье поколение киберреволюционеров, хакеры начала 80-х, создало множество прикладных, учебных и игровых программ для персональных компьютеров. Типичная фигура – Мич Кейпор, бывший учитель трансцендентальной медитации, создавший программу «Lotus 1-2-3», которая весьма способствовала успеху компьютеров IBM.

V. За годы, прошедшие с выхода книги Леви, к власти пришло четвертое поколение революционеров. Именно они преобразовали милитаристскую Arpanet в тотальную дигитальную эпидемию, известную ныне как Internet.

Хакеры читают чужие письма, воруют чужие программы и всеми доступными способами вредят прогрессивному человечеству.

9.16. Work in pairs and discuss the questions:

1. Why are we so frightened of Hacker The Mighty and The Elusive?
2. And what do hacker`s skills depends on: him, God or Holy Spirit?

9.17. Choose the topic and prepare a report (200–250 words).

1. A day in a hacker's life.
2. Hackers of today.
3. If I were a hacker...
4. Hacking for fun or running for life?
5. Do we need hackers?

UNIT 10. COMPUTER VIRUSES

Vocabulary

1. amazing [ə'meɪzɪŋ] – удивительно
2. approximately [ə'prɒksɪmɪtli] – примерно
3. attack [ə'tæk] – атака
4. bragging ['bræɡɪŋ] – хвастовство
5. bust [bʌst] – бюст
6. compelled [kəm'peld] – вынужденный
7. to destroy [dɪs'trɔɪ] – уничтожать
8. destructive [dɪs'trʌktɪv] – разрушительный
9. estimate ['estɪmɪt] – оценка
10. to exploit ['eksplɔɪt] – использовать
11. explosion [ɪks'pləʊʒən] – взрыв
12. fascination [fæsi'neiʃn] – обаяние
13. funnel [fʌnl] – воронка
14. harsh [hɑːʃ] – суровый
15. infected [ɪn'fektɪd] – зараженный
16. neighborhood ['neɪbəhʊd] – окрестности
17. properly ['prɒpəli] – должным образом
18. release [rɪ'liːs] – выпуск
19. spread [spred] – распространение
20. thrill [θrɪl] – трепет
21. to tend to [tend tuː] – иметь тенденцию к
22. virus ['vaɪərəs] – вирус

10.1. Answer the questions:

1. What threatens a computer system?
2. What is a virus?
3. What viruses do you know?
4. How do the viruses act?
5. How can you avoid getting viruses?
6. What can you do in case of infection?

10.2. Read the text. Which paragraph contains the information about:

- a) Stages of making a virus?
- b) About the reason of viruses?
- c) The third reason of releasing a virus?
- d) One of the most famous vires called Mydoom?

Computer Viruses

Computer viruses tend to grab our attention. A properly engineered virus can have an amazing effect on the worldwide Internet. For example, experts estimate that the Mydoom worm infected approximately a quarter-million computers in a single day in January 2004.

A person has to write the code, test it to make sure it spreads properly and then release the virus. A person also designs the virus's attack phase, whether it's a silly message or destruction of a hard disk. So why do people do it?

There are at least three reasons. The first is the same psychology that drives arsonists. Why would someone want to bust the window on someone else's car, or spray-paint signs on buildings or burn down a beautiful forest? For some people that seems to be a thrill. If that sort of person happens to know computer programming, then he may funnel energy into the creation of destructive viruses.

The second reason has to do with the thrill of watching things blow up. Many people have a fascination with things like explosions. When you were growing up, there was probably a kid in your neighborhood who learned how to make gunpowder and then built bigger and bigger bombs until he did some serious damage to himself. Creating a virus that spreads quickly is a little like that -- it creates a bomb inside a computer, and the more computers that get infected the more "fun" the explosion.

The third reason probably involves bragging rights, or the thrill of doing it. If you are a certain type of programmer and you see a security hole that could be exploited, you might simply be compelled to exploit the hole yourself before someone else beats you to it. That sort of logic leads to many viruses.

Of course, most virus creators seem to miss the point that they cause real damage to real people with their creations. Destroying everything on a person's hard disk or forcing the people inside a large company to waste thousands of hours cleaning up after a virus is real damage. For this reason, the legal system is getting much harsher in punishing the people who create viruses.

10.3. Answer the following questions:

1. What happened in January 2004?
2. Why do people release viruses?

3. What sort of logic leads to many viruses?
4. In what way can the creator of a virus get the more "fun" of the explosion?
5. In what case can a virus be a real damage?

10.4. Are the following statements True, False or Not Mentioned in the text?

1. A properly engineered virus doesn't have an amazing effect on the worldwide Internet.
2. A virus is parasitic code that attaches to another programme, such a visual basic or an executable.
3. Many people have a fascination with things like explosions.
4. The third reason probably involves bragging rights, or the thrill of doing it.
5. If you run Microsoft software, you should keep a look out for security alerts that the company posts on its website.
6. The legal system is getting much harsher in punishing the people who create viruses.
7. A virus is a programme that self-replicates, and they are written by people who want them spread as widely as possible.

10.5. Give the initial form of the following words:

Destructive, fascination, explosion, infected, bragging, fascination, amazing, compelled, properly.

10.6. State the part of speech:

Getting, damage, creating, destroying, waste, funnel, explosion, serious, exploited, cause, creators.

10.7. Match the opposites from A and B groups:

A) to cover, directly, old, much, more, rapidly, small, visible, powerful, long, before, to take, significant, effective;

B) to uncover, ineffective, to give, after, powerless, short, large, invisible, slowly, less, little, new, indirectly, insignificant.

10.8. Choose the right Russian equivalent:

virus: a) волос b) микроб c) бактерия d) вирус

approximately: a) далеко b) опасно c) примерно d) полностью

- properly**: a) примерно b) должным образом c) полностью d) ценно
destructive – a) разрушительный b) благотворительный c) опасный
d) ошибочный
fascination – a) интуиция b) обаяние c) интерес d) страсть
explosion – a) снаряд b) бомба c) атака d) взрыв
exploit – a) снаряд b) бомба c) атака d) взрыв
spread – a) распространение b) размах c) достижение d) передача

10.9. Match the words with their definitions:

1.Destroy	a) cruel, severe and unkind
2.Amazing	b) to force somebody to do something; to make something necessary
3.Bragging	c) a strong feeling of excitement or pleasure; an experience that gives you this feeling
4.Harsh	d) to damage something so badly that it no longer exists, works, etc.
5.Neighborhood	f) to take a particular direction or often have a particular quality
6.Thrill	g) to talk too proudly about something you own or something you have done
7.Compelled	h) very surprising, especially in a way that makes you feel pleasure or admiration
8.Tend	j) the area that you are in or the area near a particular place

10.10. Match the synonyms:

- fascination* – a). attraction b). instruction c). detail d). feature
bragging – a). amusement b). boasting c). praise d). glorification
compelled – a). forced b). affected c). amazed d). constrained
destructive – a). hurtful b). mean c). harmful d). destroying
approximately – a). nearly b). on the contrary c). around d). backward
spread – a). expansion b). achievement c). strain d). effort
exploit – a). appeal b). apply c). call d). use

10.11. Rewrite the following dialog into Reported Speech.

- What do you know about the terms viruses and vaccines?
- They have entered the jargon of the com-puter industry to describe some of the bad things that can happen to computer systems and programs.
- In what way is the virus transmitted?

– A programmer secretly inserts a few unauthorized instructions in a personal computer operating system program.

– What happens after that?

The illicit instructions lie dormant until three events occur together.

– What kind of events?

– First, the disk with the infected operating system is in use; Second, a disk in another drive contains another copy of the operating system and some data files;

Third, a command, such as COPY or DIR, from the infected operating system references a data file.

– Could you tell more about the consequences?

– The virus instructions add 1 to a counter each time the virus is copied to another disk. When the counter reaches 4, the virus erases all data files.

– Sounds dramatically!

– But this is not the end of the destruction, of course; three other disks have also been infected.

–And what about prevention?

– It is not easy to protect hard disks, so many people use antivirus programs.

– Could you tell any advice how to use them?

– You must continuously pay the price for upgrades as new viruses are discovered.

10.12. Translate the following text into English:

Количество компьютерных вирусов в Интернете выросло в пять раз за последние два года. Британские аналитики изучили сообщения, отправленные и полученные в Великобритании, и обнаружили, что одно из 300 инфицировано. Охранная фирма MessageLabs предупредила о росте числа вирусов, заражающих компьютеры клиентов. Было обнаружено, что из-за роста интернет-трафика, количество вирусов увеличивается более быстрыми темпами. Стив Триллинг, директор по исследованиям в антивирусной компании Symantec Security Response, говорит, ситуация резко ухудшится из-за улучшения технологий. “Новые технологии помогут этим вирусам стать более опасными. Потенциальная опасность для интернета и экономики больше, чем когда-либо“, – сказал он. В 2001 году правительственный интернет-сервис безопасности, Uniras, издал запись 26 предуп-

реждений – предупреждения высокого уровня о вирусах, которые угрожают национальной инфраструктуре - в три раза больше, чем в 2000 году.

10.13. Put the verbs into the Passive Voice.

1. Last week researchers revealed that computer viruses cost firms more than £18 billion globally in 2001.

2. The 'Love Bug' and 'Code Red II' viruses had caused considerable damage.

3. The Government's internet security service issued a record 260 emergency briefings about virus threats.

4. “We see old viruses again and again that never seem to die out,” said Alex Shipp, chief antivirus technologist.

5. New technologies reduce the potential danger to the internet and economy.

6. It is not easy to protect hard disks, so many people use antivirus programs.

7. Before we use any flash-card in a computer system, the antivirus program scans it for infection.

8. A computer program stops the spread of and often eradicates the virus.

9. Someone you know may sent to you email viruses.

10. Often the company discovers a hole in its software, posts a fix for it, and then weeks later a virus exploiting that very flaw infects thousands of users.

10.14. Choose a topic and make a report.

1. E-mail Viruses

2. Information Systems and Technologies

3. Computer network

4. What are computer viruses and how do they differ?

5. What makes a perfect virus?

6. A day in the life of the virus hunter

7. Will the computer apocalypse be?

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