МИНИСТЕРСТВО ОБРАЗОВАНИЯ АРХАНГЕЛЬСКОЙ ОБЛАСТИ
Государственное автономное профессиональное образовательное учреждение
Архангельской области
«Архангельский политехнический техникум»
(ГАПОУ АО «Архангельский политехнический техникум»)

Методическая разработка на конкурс «Методическая копилка»
в номинации «Лучшее электронное пособие»

Практические занятия по дисциплине ОГСЭ.03 «Иностранный язык в профессиональной деятельности» для специальности 08.02.09 Монтаж, наладка и эксплуатация электрооборудования промышленных и гражданских зданий

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Аннотация

Данная методическая разработка выполнена в соответствии с рабочей программой по дисциплине ОГСЭ.03 Иностранный язык в профессиональной деятельности для специальности 08.02.09. Монтаж, наладка и эксплуатация электрооборудования промышленных и гражданских зданий и может быть использована на занятиях по иностранному языку как для работы в классе, так и для дистанционного обучения или самостоятельной работы по предмету. При составлении данного пособия были использованы существующие рекомендованные печатные издания, актуальные источники информации (сайт компаний по электромонтажу и т.д.), так и самостоятельные разработки автора.

Содержание

Предисловие

Данное электронное пособие подходит для изучающих дисциплину ОГСЭ.03 «Иностранный язык в профессиональной деятельности» по специальности 08.02.09. «Монтаж, наладка и эксплуатация электрооборудования промышленных и гражданских зданий», содержит материал на иностранном языке по основным темам из области физики, электротехники, основ безопасности на рабочем месте.

Пособие выполнено в качестве ЭОР, доступно на сайте образовательного учреждения для самостоятельного изучения материала, а также для работы на занятии. Пособие имеет гиперссылки для более удобного перемещения между темами практических занятий.

Assessment test. Проверь свой уровень.

Dear students, welcome to processional English!
Before starting the course, revise your knowledge of grammar and vocabulary.
Good luck!

Choose the right answer and fill in the form after the test. You can check your answers in the end of this book.

1. I am not tired at all. If I ___ to bed now, I wouldn't sleep.
a) go b) did go c) would go d) went

2. At first I didn't like this job, but _____it now.
a) I begin to enjoy b) I began enjoying c) I begin enjoying d) I begin enjoying

3. We didn't spend much money, just _____.
a) a few b) little c) a little d) few

4. Your bag is too heavy. Let me ____ it for you.
a) carry b) to carry c) carrying d) that I carry

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5. Do you know how to drive an automatic gear car?
a) Yes, I did b) Yes, I do c) Yes, I can d) Yes, I am

6. What will be the date of your wedding? The 14th or the 15th of February? - _____. It will be the 16th.
a) Neither b) Either c) Neither nor d) None

7. The sauce is great! It ____ so good.
a) tastes b) is tasting c) tasting d) is tasted

8. Turn off your loud music! Don't you know what _____?.
a) time is it b) time it is c) is the time d) time

9. I am looking forward _____ your colleague!
a) to meet b) to see c) for meeting d) to meeting

10. Mary was on her knees on the floor. She ____ her contact lenses and was looking for it.
a) lost b) loosing c) had lost d) had been losing

11. When we arrived to the office we saw that the thieves ____.
a) had broken in b) were breaking in c) had been breaking in d) broke in

12. Some names in the list were crossed ____.
a) in b) out c) under d) with

13. The woman who entered the room was a complete stranger to me. I _____her in my life.
a) was never seeing b) didn't never see c) have never seen d) never saw

14. He is phoning his girlfriend again. It is the third time _____ her.
a) he is phoning b) he phones c) he phoned d) has phoned

15. _____ I use you phone? Mine is out of order. – Sure, no problem.
a) can b) may c) shall d) would

16. When ____ school? – Five years ago.
a) have you left b) did you leave c) are you leaving d) leaves

17. The policeman tried to stop the thief, but he managed to_____.
a) take off b) get off c) take away d) get away

18. If you ____ a mistake, just cross it out and start again.
a) do b) did c) is doing d) have done

19. Be careful, these dogs are difficult ____.
a) to control b) controlling c) of control d) of controlling

20. I have never been to Ireland. - _____.
a) Neither do I b) Me too c) Neither did I d) Neither have I

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Write down you answer in the table below.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
11.	12.	13.	14.	15.	16.	17.	18.	19.	20.

Check your answers:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
a	d	c	a	b	a	a	b	d	c
11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
a	b	c	c	b	b	b	d	a	d

Практическое занятие 1. Физические термины и обозначения.

Physics terms and definitions

Цель ПЗ 1: установление соответствий иноязычных терминов с терминами на родном языке.

Задачи ПЗ 1:

- **Автоматизация навыков чтения и перевода текста**
- **Автоматизация лексико-грамматических навыков обучающихся**

Task 1. Read the terms and definitions, translate them and write down the Russian equivalent to each of them / Прочитайте термины и их определения, переведите их и запишите их соответствия на русском языке:

Electric Circuits

Conventional Current Flow: Flow from positive to negative, used to describe the direction of current in a circuit.

Current: The rate of flow of charge in a circuit measured in Amperes and has symbol I.

Detecting Circuit: A circuit with a potential divider with one of the resistors being a semiconductor which when an external condition changes will change its resistance and change the voltage across the other resistor in the potential divider.

Diode: Components that allow current through in one direction. In the correct direction, diodes have a threshold voltage (typically 0.6 V) after which current flows normally.

Electromotive Force (EMF): The energy supplied by a source per unit charge passing through the source, measured in volts.

Electron Flow: The flow of electrons in a circuit, from negative to positive.

Internal Resistance: The unavoidable resistance any power source will have that makes it harder for current to flow through the source. It causes energy to be dissipated in the source.

Kirchoff's First Law: The total current entering a junction is equal to the total current leaving it.

Kirchoff's Second Law: The sum of EMF in any loop of the circuit is equal to the sum of the potential differences of each component.

Light Dependent Resistors (LDR): When these components are illuminated with light their resistance goes down. As light intensity increases resistance decreases.

Ohmic Conductor: A conductor following Ohm's law where current flowing through it is directly proportional to the potential difference between each end of the conductor. This only holds if the conductor is kept at a constant temperature.

Ohm's Law: Electric current is proportional to potential difference and inversely proportional to resistance.

Parallel Connection: When two electrical components are on separate loops to one another in a circuit. Potential difference over each loop is the same, current is split between branches.

Potential Difference: The difference in electrical potential between two points in a circuit and the work done that is required per coulomb to move a charge from the lower potential point to the higher potential point. It is measured in Volts.

Potential Divider: A combination of two or more resistors in series. These result in the potential difference of the circuit being split into a specific ratio depending on the resistance of the resistors. They can be used to get a specific output voltage from the circuit.

Power: Rate of energy transfer in a circuit. It can be calculated as the product of the current and the potential difference between two points. It is measured in Watts.

Resistance: A measure of how difficult it is for current to flow in a circuit or component measured in Ohms and has symbol R.

Resistivity: A measure of how difficult it is for charge to travel through a material, depending on the material cross sectional area, length and resistance. It is measured in Ohm meters and has symbol ρ.

Semiconductors: Materials that change their resistance depending on external conditions.

Series Connection: When two electrical components are on the same loop to one another in a circuit. Potential difference is split between components depending on their resistance; current is the same across all components.

Superconductor: A material that has zero resistivity below a critical temperature. They are used for very efficient electricity transmission or to create very strong magnetic fields but require extreme cooling to reach their critical temperatures.

Terminal Potential Difference: The actual potential difference across the terminals of a power source. It is the source's EMF minus the voltage drop due to the source's internal resistance.

Thermistor: When these components are heated up their resistance goes down. As temperature increases resistance decreases.

Variable Resistors: A resistor that can have its resistance changed. Typically, these are used with power supplies to change the voltage of a circuit without using a transformer.

Voltmeter: A device used to measure the potential difference between two points on a circuit; ideally it has infinite resistance so no current passes through it.

Отчет о выполненном ПЗ:

1. Составленный глоссарий по теме «Физические термины и их определения»

Практическое занятие 2. Фундаментальные понятия электротехники.
The Fundamental Electrical Concepts

Цель ПЗ 2: Определение основных понятий электротехники
Задачи ПЗ 2:

- **Автоматизация навыков чтения (поискового, просмотрового)**
- **Повторение грамматического материала (страдательный залог)**

Task 1. Read the concepts and find the words in English after texts:

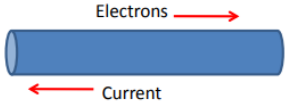
1. Субатомные частицы –
2. Заряженные частицы –
3. Знак отрицания –
4. Постоянная величина –
5. Потенциальная энергия –
6. Электростанция –
7. Статическое электричество –
8. Преобразователь –
9. Заземление –
10. Постоянный/переменный ток –

Electric Charge (Q)

- Characteristic of subatomic particles that determines their electromagnetic interactions
- An electron has a $-1.602 \cdot 10^{-19}$ Coulomb charge
- The rate of flow of charged particles is called current

Current

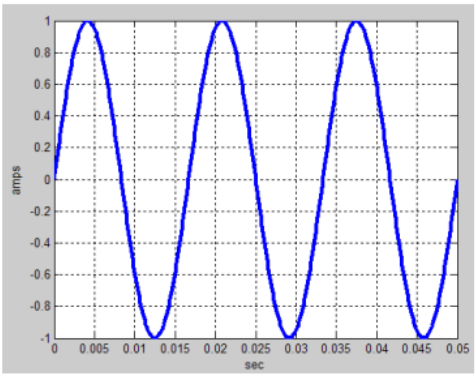
- Current = (Number of electrons that pass in one second) · (charge/electron)
  - -1 ampere = $(6.242 \cdot 10^{18}$ e/sec) $\cdot(-1.602\ 10^{-19}$Coulomb/e)
  - Notice that an ampere = Coulomb/second
- The negative sign indicates that the current inside is actually flowing in the opposite direction of the electron flow



AC and DC Current

•DC Current has a constant value

•AC Current has a value that changes sinusoidally



➢Notice that AC current changes in value and direction

➢No net charge is transferred

Terms to Remember

- The ***Source*** can be any source of electrical energy. In practice, there are three general possibilities: it can be a battery, an electrical generator, or some sort of electronic power supply.
- The ***Load*** is any device or circuit powered by electricity. It can be as simple as a light bulb or as complex as a modern high-speed computer.
- (***Path***) a wire or pathway which will allow electron to flow throughout a circuit.
- ***Electricity*** can be described as the flow of charged particles. If the particles accumulate on an object, we term this static electricity.
- (***Direct Current***) An electrical current that travels in one direction and used within the computer's electronic circuits.
- (***Alternating Current***) The common form of electricity from power plant to home/office. Its direction is reversed 60 times per second.
- ***Circuit*** is a conducting path for electrons.

Voltage

- Voltage is a measure of the potential energy that causes a current to flow through a transducer in a circuit
- Voltage is always measured as a difference with respect to an arbitrary common point called ground
- Voltage is also known as electromotive force or EMF outside engineering

Отчет о выполненном ПЗ:

1. Список из 10 слов

Практическое занятие 3
Требования к спецодежде. Uniform requirements.

Цель ПЗ – введение новых лексических единиц по теме
Задачи ПЗ:

- Автоматизация навыков чтения и перевода текста
- Повторение особенностей научно-популярного и делового стиля языка

Task 1. Read the text and translate it:

Uniforms give employees a professional and an executive look. It helps in reducing anxiety among employees over what they should wear and saves a lot of stress in the morning. No matter how high a person might be in a company, uniforms put everyone on the same platform. It creates a sense of unity and is a tremendous team-building resource. It helps avoid dress code violations and pleases the consumers to approach the members engagingly. They also ensure to provide security and protect the employees from harm.

What do electricians wear? Are there any specific outfits, or can they opt for regular clothing?

Electrical laborers are required to wear flame-resistant protective clothing, and oil rig electricians are required to wear a full-body fire-resistant suit or uniform. Protecting by making them wear proper fire-resistant attire or outfit is crucial for their safety. There is a famous saying

that safety is a priority, treats safety as an essential item on the “to-do” list, and safety is the only essentials for the organization as their employees are their irreplaceable assets.

PROPERTIES OF ELECTRICIAN UNIFORMS:

Companies ensure to provide maximum safety to employees by offering safety vests and fire-resistant uniforms. Though, they don’t want to raise the problem of heat stress among the members.

Suggested to opt for flame-resistant garments to be

- Light
- Thin
- Breathable.

The electrician uniforms need to be waterproof, wind-resistant.

Custom work vests provide comfort, ensure safety as well as the breathable factor for employees. They also offer an additional workwear collection of embroidered logos to enhance brand recognition and make it more visually appealing.

Safety vests first:

For a company with safety as the core value, security becomes a way of life. Electricians must wear a safety vest if they are on a construction site or working at night. An adjustable vest is an excellent option for the electrician’s outfit as it is comfortable during work. There are a variety of safety vests available with a vast collection of colors.

- Adjustable vests
- Safety jackets
- Flame resistant vests
-

A safety vest has the sole purpose of wearing. It plays a vital role in keeping workers safe by promoting visibility. Safety vests ensure to comprise materials that are versatile and offer protective properties as well. High visibility clothing reduces the risk of accidents and improves safety overall. Flame-resistant vests designed that are less likely to get exposed to combustion or fire.

Safety is a priority

Always choose the uniforms which adhere to the relevant safety standard. The health and safety inspectors conduct inspections on the risk assessment and safety factors of the uniforms. Deal with reputed uniform manufacturers or dealers which offer flame-resistant clothing to the electricians.

Budget

A uniform plays a significant role as they represent your company. So always invest in high-quality, long-lasting uniforms, which ensure safety and durability. It is crucial to be realistic with your budget affordability and also provide protection to the workers.

The safety of skilled and unskilled workers has become a factor of primary concern. The places where electricians work, like construction sites, office spaces, are known for unexpected accidents. It is imperative to provide workwear or uniforms to electricians who are safe and suitable for construction activities.

- Skin protection: Protective overalls are designed with specific materials that keep the workers safe from threats at the workplace.
- Body temperature: Electrician uniforms need to be made with warm materials and are also waterproof and resistant.
- Sense of belonging among the workers while wearing the same uniforms representing the brand identity.
- Skin protection.
- Safety is primary concern.
- Comfortable workwear and visibility.

Protective workwear for electricians is crucial as it influences the safety and health of the workers. It is gaining immense importance at the workplace as it determines the safety of the workers. Safety shoes, boots, face shields, gloves, helmets are essential as it lessens the likelihood of injuries. Adherence to various laws and policies which foster safety and administration needs to be abided by.

Task 2. Find the words and expressions from the text:

1. Защитная одежда –

2. Рабочая одежда –

3. Водонепроницаемый –

4. Ветронепроницаемый –

5. Огнеупорный –

6. Заметность –

7. Защитные свойства –

8. Инженер отдела охраны труда –

9. Безопасность прежде всего –

10. Уменьшать вероятность травм –

11. Комбинезон –

12. Защитная куртка (спецовка) –

13. Защитная обувь –

14. Каска –

15. Защитная каскетка для лица –

Task 3. Complete the table using the words from Task 2 and look up for the new ones in a dictionary. You may use www.multitran.com. Copy the table in your copybook.

PPE type	**PPE item**
Специальная одежда	Костюм, каска
Специальная обувь	Ботинки, сапоги для защиты от общих производственных загрязнений и механических повреждений
СИЗ для защиты рук	Перчатки, рукавицы, от общих производственных загрязнений и механических повреждений

СИЗ для защиты глаз	Очки защитные
СИЗ для защиты лица	Щиток защитный
СИЗ органов дыхания	Респиратор, противогаз, самоспасатель
СИЗ от падения с высоты	Страховочные, удерживающие, позиционирующие и другие системы защиты (страховочные привязи, тросы, карабины).
СИЗ для защиты головы	Каскетка защитная для защиты от удара об неподвижный предмет, а также от брызг металла и электрических разрядов.
Средства защиты от поражения электрическим током	
Диэлектрическая обувь	Боты, галоши диэлектрические для защиты от поражения электрическим током. Служат изолирующим средством электрозащиты.
СИЗ для защиты рук	Диэлектрические перчатки
Дополнительно	Изолирующие накладки, колпаки, диэлектрические ковры
	Указатели высокого напряжения
	Диэлектрическая штанга
	Указатели низкого напряжения
	Изолирующий инструмент
	Аптечка первой помощи

Отчет о выполненном ПЗ:

1. Слова из текста Task 1.
2. Таблица СИЗ на английском в тетради.

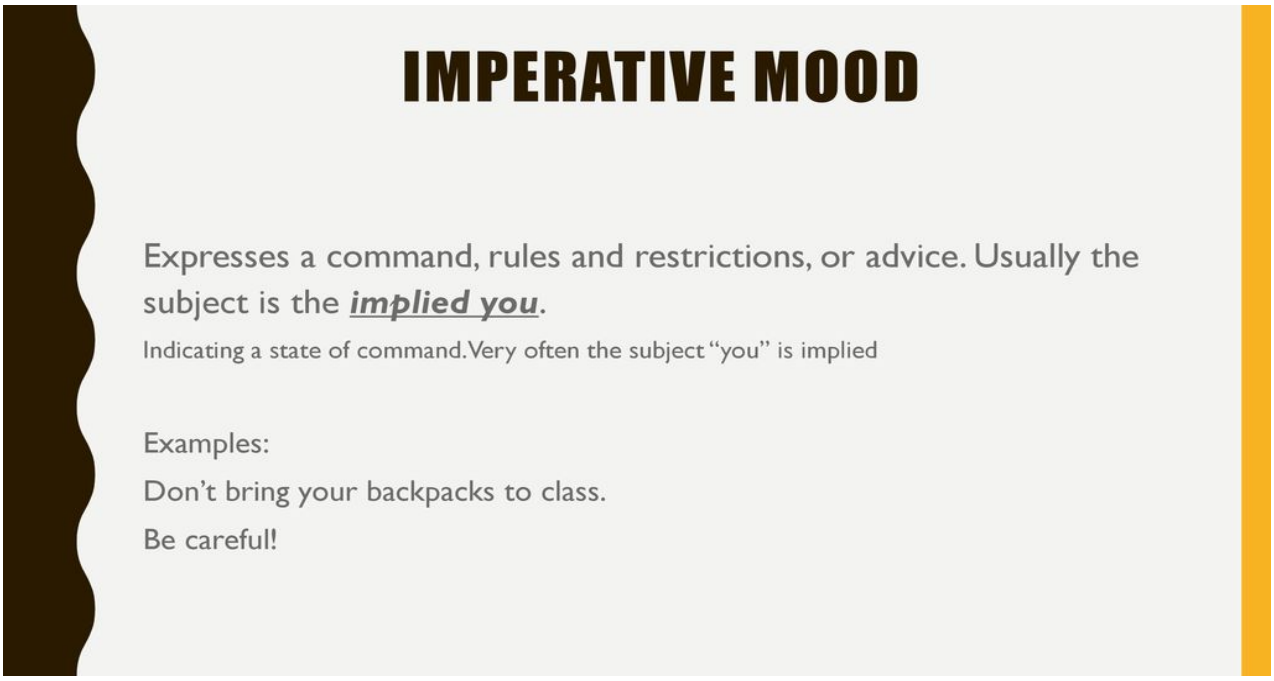
Scan this QR-code to learn more words about your profession!

Практическое занятие 4
Техника безопасности на рабочем месте. Safety at a workplace

Цель ПЗ: работа с текстом инструкции по безопасности
Задачи ПЗ:

- Автоматизация навыков чтения
- Автоматизация навыков перевода
- Повторение повелительного наклонения (do or don't)
- Повторение модальных глаголов

Task 1. Study the following information about the Imperative Mood:



Infinitive	Base	Affirmative Imperative	Negative Imperatives
to be	be	be	do not be
to do	do	do	do not do
to eat	eat	eat	do not eat
to drink	drink	drink	do not drink
to go	go	go	do not go
to sleep	sleep	sleep	do not sleep
to stay	stay	stay	do not stay
to stop	stop	stop	do not stop
to study	study	study	do not study
to wait	wait	wait	do not wait

Task 2. Do the exercises A, B, C, D.

A. Complete the imperatives with the verbs from the box.

write	speak	mix	be	give	turn	pass	clean	leave	ask

1. _____ me the salt please.
2. _____ him to come to see a movie with you.
3. _____ me alone or I'll call the police.
4. _____ quietly or I'll make a complaint.
5. _____ those windows before your mother gets home.
6. Don't worry, _____ happy.
7. _____ me 5 minutes, I'm nearly ready.
8. _____ left and then go straight on.
9. _____ this address down so you don't forget it.
10. _____ the ingredients together until there are no lumps.

B. How is each imperative above used? Write the number of the sentence under the correct column.

An order / suggestion	Instructions	A warning	A request

C. Put the words in order to form imperatives. Then, indicate each imperative's usage, e.g. an order, a warning, etc.

1. chewing me gum give that
_____
2. seat a take please
_____
3. teaspoon of flour the a add to salt
_____
4. now down sit
_____
5. out watch
_____
6. worry it about don't
_____
7. leave your car in don't the belongings
_____
8. here please smoke don't
_____
9. touch shock don't you a that will wire get
_____
10. here out get of
_____

D. Now, use your own ideas to write an example for each imperative usage.

An order: _____

A suggestion: _____

Instructions: _____

A warning: _____

A request: _____

Task 3. Read the text, translate it and find 6 examples of positive and negative forms of the imperative mood, write them down.

10 ELECTRICAL SAFETY TIPS FOR THE WORKPLACE

Today, any office or workplace setting operates on electricity. Electrical equipment, from computers to machinery can all be potentially hazardous and can cause shock and burn injuries if improperly used or maintained. Though most general personnel don't need specialized electrical safety training, if you work around electricity, but are not qualified to directly handle electrical components, it's important to follow electrical safety-related work practices to keep yourself and others safe. Here are 10 electrical safety tips for the workplace to help you avoid electrical hazards:

01. PREVENT ALL POTENTIAL CONTACT WITH LIVE ELECTRICAL CURRENT

The best way to stay safe is to stay away from electrical hazards. Unqualified personnel should not interact or come close to electrical currents greater than 50V. If you must work in the same area or room as an electrical hazard or equipment operating on more than 50V, maintain a safe distance. All panel doors should be shut, and there should be no exposed wires around your work area before you begin your operations.

02. DE-ENERGIZE EQUIPMENT AND USE LOCKOUT/TAGOUT

Exposed, live electrical parts must be de-energized before work on or near them is permitted. Prevent accidents and isolate electrical energy by locking and tagging out the electrical system or parts of the system according to your company's Lockout/Tagout policy.

Lockout/Tagout exists to protect employees from electrical hazards while performing servicing and maintenance activities.

03. ENSURE SAFE USE OF ELECTRICAL EQUIPMENT

Properly using all electrical equipment can go a long way to ensure everyone's safety in the workplace.

Employees should take care to handle electrical cords properly:

- **Always unplug cords by pulling on the plug head, rather than the cord**
- **Don't press or overstretch electrical cords**
- **Don't fasten cords with staples**
- **Don't hang electrical equipment from cords**

Additionally, all cords and plugs in the workplace should be visually inspected for external defects prior to use. If you encounter a cord or plug with damage, do not use that equipment.

04. INSTALL PROPER PHYSICAL BARRIERS AROUND ELECTRICAL HAZARDS

Physical barriers should always be used to protect employees from any electrical hazards. Cabinet doors on electrical panels should always be closed, and panels should not have holes where an employee could come into contact with exposed wires.

If cabinets cannot be closed, or if an electrical hazard cannot be fully closed in, shields, barriers, or insulating materials should be used.

For example, if a qualified electrician is performing maintenance on an electrical panel and must keep the panel open, physical barriers should be put in place to prevent others from entering the area. Signs should be placed to warn employees of the hazard, and the area in front of the electrical panel should be kept free of any obstructions.

05. BEWARE OF CONDUCTIVE TOOLS AND CLEANING MATERIALS

If you are working in an area where an electrical hazard is present, always assume that electrical parts are live, and act accordingly. Do not use conductive tools in the area.

If you are cleaning the area, note that some cleaning materials are conductive as well and require additional caution. Solvent and water-based cleaning materials are electrically conductive, as are steel wool and metalized cloth. Keep these cleaning products, as well as any conductive tools, away from live electrical parts and equipment.

06. WHEN WORKING OVERHEAD, LOOK ABOVE FOR ELECTRICAL LINES

When performing any work or maintenance overhead, beware of electrical lines. In most workplaces, there is the potential for live electrical equipment and parts above the floor level, which are only accessible with ladders or elevated platforms. Be sure to use a portable ladder with non-conductive side rails, and stay at least 10 feet away from any exposed electrical lines while you are performing overhead work.

07. USE EXTREME CAUTION WITH FLAMMABLE MATERIALS

Electrical equipment that can cause ignition must not be used where flammable vapors, gases, or dust are present. The only exception to this rule is when qualified personnel take measures to lockout and isolate electrical energy sources before these potentially flammable materials may be used or the electrical equipment is designed for use under these types of conditions.

08. ONLY QUALIFIED PERSONNEL SHOULD WORK ON LIVE ELECTRICAL WIRES

If you encounter a live electrical wire, stay away. Only qualified personnel with the proper training should work on live electrical wires. The same electrical safety precaution applies to hazardous electrical equipment. Any live electrical hazard should only be approached and managed by qualified personnel. If you see a live electrical wire that is not attended, you should notify the appropriate electrical safety personnel, who should immediately place physical safety barriers.

09. ALWAYS FOLLOW YOUR COMPANY'S ELECTRICAL SAFETY WORK PRACTICES

Every company has unique electrical safety work practices depending on the electrical equipment and hazards present in your industry and workplace. It is important to always follow your company's specific electrical safety work practices to keep yourself, and other employees safe.

10. ELECTRICAL SHOCK CAN BE DEADLY

In every situation, treat an electrical part as if it is live. Electrically live parts do not look different from de-energized parts. To ensure safety, it's best to assume that any electrical part is live. Take precautions to keep power on its path, and protect yourself. You can't be too careful when it comes to electricity.

Отчет о выполненном ПЗ:
1. Выполненные упражнения A, B, C, D.
2. 12 форм из текста в повелительном наклонении.

Практическое занятие 5
Поражение электрическим током.
Electric Shock.

Цель ПЗ: изучение новых лексических единиц, необходимых при работе на производственном участке в случае экстренной ситуации

Задачи ПЗ:

- Введение новых слов по теме «Человеческое тело»
- Автоматизация модальных глаголов.

Task 1. Revise all the modal verbs:

TYPE	MODAL VERBS	EXAMPLES
ABILITY	**CAN** **COULD** **(WAS ABLE TO)**	Charles **can** speak three languages. He **could** speak fluent French when he was 6. We **cannot** track goods in transit. I **was able to** install the new software.
PERMISSION	**CAN** **COULD** **MAY**	You **can** park on the street after 6 pm **Could** I open the window? **May** I borrow your pen?
ADVICE	**SHOULD** **OUGHT TO**	You **should** invest more heavily in marketing. You **should**/ **ought to** go to the doctor
OBLIGATION	**MUST** **HAVE TO** **(in past)** **HAD TO**	We **must** finish the Meeting by 11 at the latest. I **have to** get to the airport. You **have to** pay the invoice within 60 days. **Do you have to** work this evening? (in questions) You'll **have to** contact them immediately (more informal for necessity) You **have to / need to** sign this form in 2 places. I **had to** send some figures to the financial controller. Or I **didn't have to** take a taxi.
POSSIBILITY	**MIGHT** **MAY** **COULD**	I **might** have more news for you next week. *(=It is possible I will have…)* It **could** take a long time to arrange the

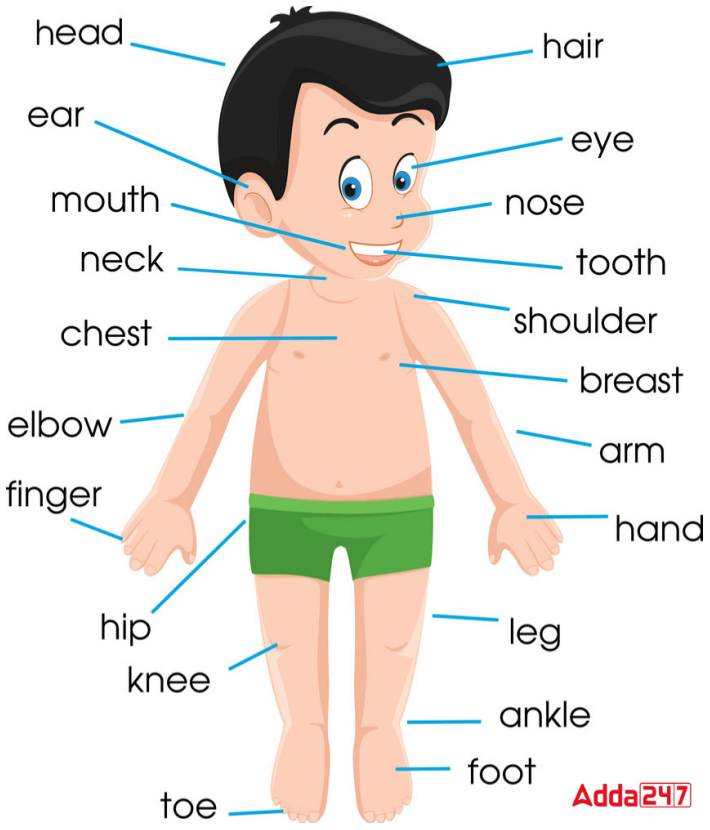
	CAN	finance. You **might not** agree but listen to the proposal. This hotel looks great, but it **can** be very expensive.
PROHIBITION	**MUSTN'T**	You **mustn't** talk about politics at dinner tonight.

Put the right modal verb in the gaps:

1. One _____ work close to power lines.
2. If you are close to power lines, you _____ first call your electrical utility company and they will assist you.
3. A painful non-fatal shock _____ occur during the time that it takes for the GFCI to cut off the electricity so it is important to use the GFCI as an extra protective measure rather than a replacement for safe work practices.
4. If the GFCI is working properly, the light _____ go out.
5. Electricity _____ be either "static" or "dynamic."

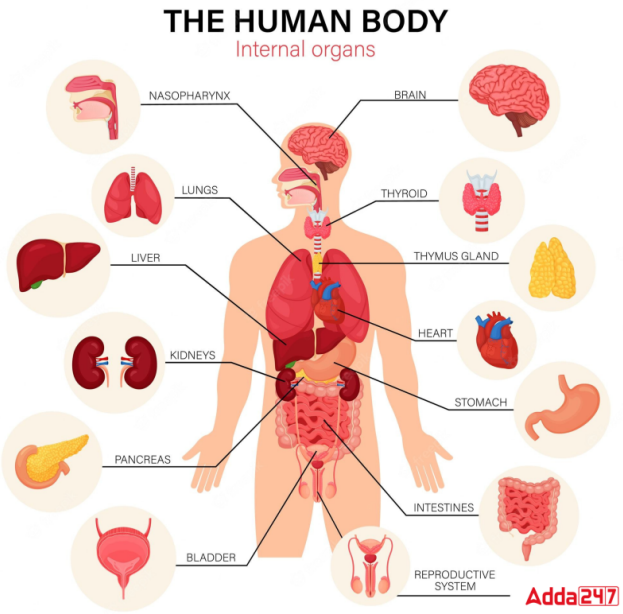
Task 2. Look at the picture; match the names of the body part with the words.

Голова
Ухо
Глаз
Нос
Шея
Плечо
Грудная клетка
Рука
Кисть
Локоть
Палец руки
Палец ноги
Зуб
Лодыжка
Грудь
Колено
Нога
Ступня
Бедро
Рот
Волосы



Внутренние органы

Мозг
Легкие
Щитовидная железа
Почки
Желудок
Поджелудочная железа
Мочевой пузырь
Репродуктивная система
Печень
Кишечник
Вилочковая железа
Носоглотка
Сердце



Task 3. Read the texts and find the following sentences in English.

- An electric shock occurs when someone comes in contact with an electric energy source.

or

- It is the physiological reaction or injury caused by electric current (AC/DC) passing through the human body

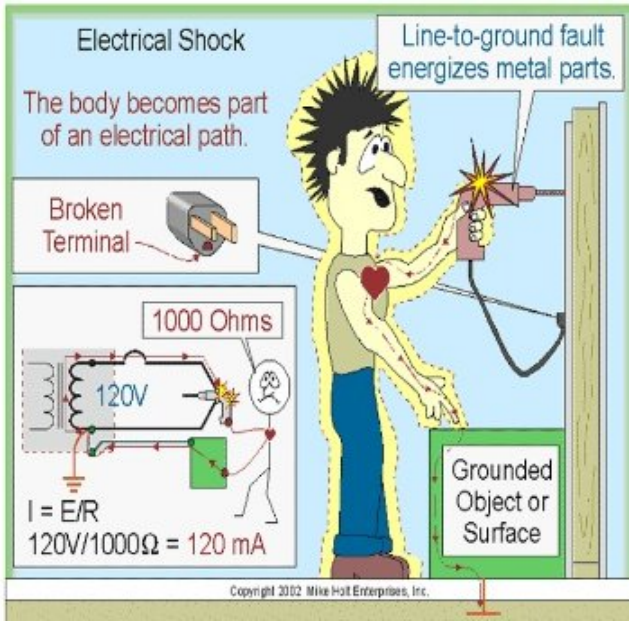


Table 1. Physical Effects at Selected Currents[14,15]

Current (mA)	Response
0.2-2	"Electrical" sensation
1-2+	Painful shock
3-5	Let-go threshold for children
6-10	Minimum let-go threshold for adults
22	99% of adults cannot let go
10-20	Tetany (contact area)
20-50	Tetany (respiratory muscles)
50-100	Ventricular fibrillation

What are the hazards?

The main hazards of working with electricity are:

- electric shock and burns from contact with live parts
- injury from exposure to arcing, fire from faulty electrical equipment or installations
- explosion caused by unsuitable electrical apparatus or static electricity igniting flammable vapours or dusts, for example in a spray paint booth

Electric shocks can also lead to other types of injury, for example by causing a fall from ladders or scaffolds etc.

What kinds of injuries result from electrical currents?

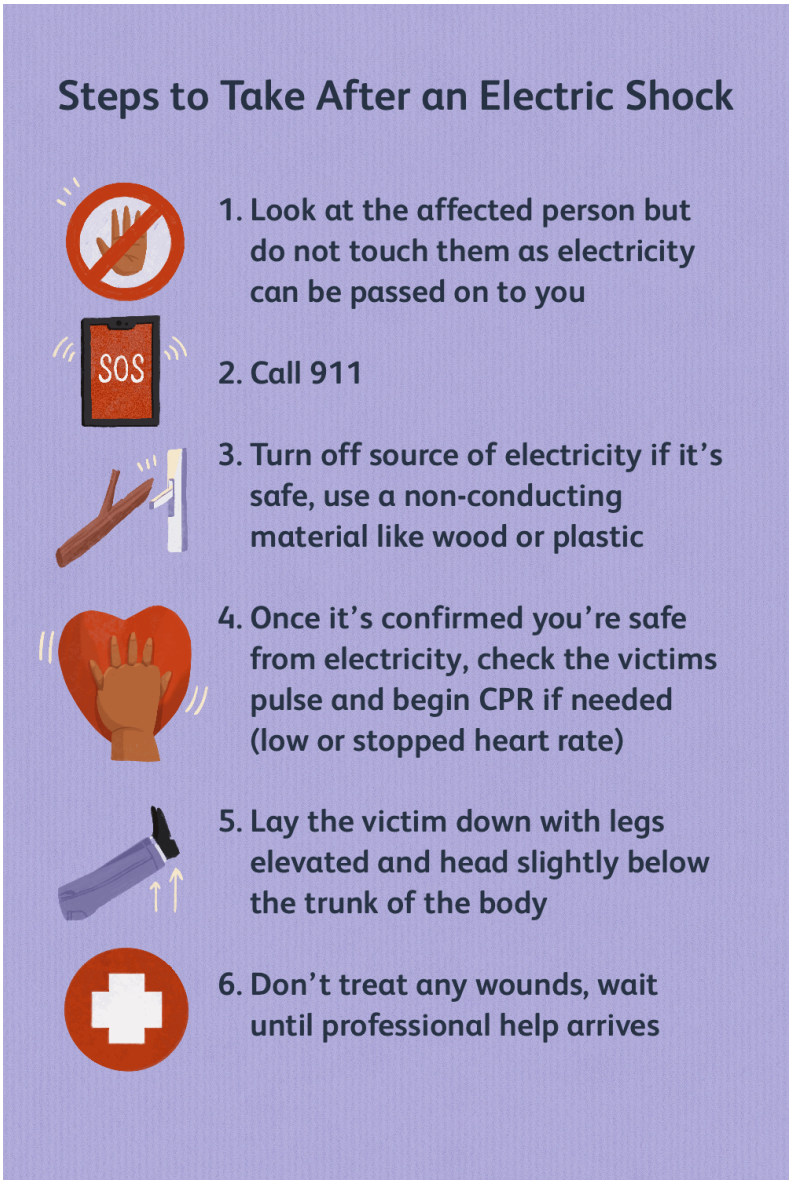
People are injured when they become part of the electrical circuit. Humans are more conductive than the earth (the ground we stand on) which means if there is no other easy path, electricity will try to flow through our bodies.

There are four main types of injuries: electrocution (fatal), electric shock, burns, and falls. These injuries can happen in various ways:

- Direct contact with exposed energized conductors or circuit parts. When electrical current travels through our bodies, it can interfere with the normal electrical signals between the brain and our muscles (e.g., heart may stop beating properly, breathing may stop, or muscles may spasm).
- When the electricity arcs (jumps, or "arcs") from an exposed energized conductor or circuit part (e.g., overhead power lines) through a gas (such as air) to a person who is grounded (that would provide an alternative route to the ground for the electrical current).
- Thermal burns including burns from heat generated by an electric arc, and flame burns from materials that catch on fire from heating or ignition by electrical currents or an electric arc flash. Contact burns from being shocked can burn internal tissues while leaving only very small injuries on the outside of the skin.
- Thermal burns from the heat radiated from an electric arc flash. Ultraviolet (UV) and infrared (IR) light emitted from the arc flash can also cause damage to the eyes.
- An arc blast can include a potential pressure wave released from an arc flash. This wave can cause physical injuries, collapse your lungs, or create noise that can damage hearing.
- Muscle contractions, or a startle reaction, can cause a person to fall from a ladder, scaffold or aerial bucket. The fall can cause serious injuries.

1. Судороги –
2. Порог –
3. Фибрилляция желудочков –
4. Находящиеся под током (напряжением) части –
5. Смертельное поражение электрическим током (1 слово) –
6. Воспламеняемые пары –
7. Термические ожоги –
8. Вспышка дуги –
9. Реакция испуга –
10. Повредить слух –
11. Люлька автоподъемника –

Task 4. Read the safety rules and translate them into Russian:



Отчет о выполненном ПЗ:
1. Упражнения 1,2,3,4.

Глоссарий по терминам:

GLOSSARY

Words in *italics* are mentioned elsewhere in the Glossary

a.c. An abbreviation for *alternating current*

accumulator An electrical *storage battery,* that is, a battery which can be recharged by passing *direct current* through it

alternating current A current which alternately flows in one direction and then in the opposite direction

alternator An alternating current *generator*

ammeter An instrument for the measurement of electrical *current*

ampere The unit of electrical *current*

ampere-turn The unit of *magnetic field intensity* (H) or *magnetising force,* which is calculated from amperes x turns on the coil; since «turns» are dimensionless, it is given the unit of the «ampere» by electrical engineers

anode (1) In a *diode* it is the *electrode* by which the *current (hole* flow) enters; (2) In *electrolysis,* it is the electrode to which negative ions are attracted

apparent power In an a.c. *circuit,* it is the product, volts × amperes (or the volt-ampere [VA] product)

average value The average value of an alternating wave. An alternative name is *mean value*

back e.m.f. The e.m.f. induced in an *inductor* when the *current* through it changes

capacitance The property of a *capacitor* which enables it to store electrical charge

capacitive reactance The opposition of a *capacitor* to the flow of *alternating current.* No *power* is dissipated in a pure capacitive reactance. Symbol X_C, measured in Ohms

capacitor Consists of two conducting surfaces or 'plates' separated by an insulating *dielectric,* which has the ability to store electric charge

cathode (1) In a *diode,* it is the *electrode* by which the *current (hole* flow) leaves; (2) In *electrolysis,* it is the electrode to which the positive *ions* are attracted

cell Converts chemical energy into electrical energy

circuit An interconnected set of *conductors*

coercive force The *magnetising force* needed to *demagnetise* completely a piece of magnetised material

complex wave A wave which contains a *fundamental frequency* together with a number of *harmonic frequencies*

conductance Reciprocal of *resistance.* Symbol G, and measured in Siemens (S)

conductivity Reciprocal of *resistivity*

conductor An element which freely allows the flow of electric *current*

core loss Energy loss in an electrical machine as a result of the combined effects *of hysteresis loss* and *eddy current* loss

coulomb The unit of electrical charge, symbol C

current Rate of flow of electrical charge. Symbol I, and measured in *amperes* (A)

d.c. Abbreviation of *direct current*

depolarising agent A chemical included in a *cell* to prevent *polarisation*

dielectric An insulating material which separates the plates of a *capacitor*

diode A two-electrode device, the electrodes being the *anode* and the cathode

direct current *Current* which flows in one direction only, that is, a unidirectional current

eddy current *Current* induced in the iron circuit of an electrical machine because of changes in *magnetic flux*

efficiency Ratio of the power output from a machine or circuit to its input power; expressed as a per centage if the ratio is multiplied by 100, and is dimensionless

electric field intensity The potential gradient in volts per metre in the material

electric field intensity The potential gradient in volts per metre in the material

electric flux A measure of the electrostatic field between two charged plates; measured in coulombs

electric flux density The amount of *electric flux* passing through one square metre of material

electrode (1) In a *semiconductor* device it is an element which either emits *current* or collects it; (2) In an electrolytic cell it is a metallic conductor where the *ions* give up their charge

electrolysis A chemical change brought about by the passage of *direct current* through an *electrolyte*

electrolyte A substance which, when dissolved, produces a conducting path in the solvent (which may be water)

electromagnet A current-carrying coil with an iron core

electromagnetic induction The production of an *e.m.f.* in a circuit, arising from a change in the amount of *magnetic flux* linking the circuit

electromotive force The *p.d.* measured at the terminals of a *cell, battery* or *generator* when no *current* is drawn from it; abbreviated to *e.m.f.* and measured in *volts*

electron A negative charge carrier, and a constituent part of every atom

e.m.f. Abbreviation for *electromotive force*

farad The unit of *capacitance,* symbol F; submultiples such as the microfarad, the nanofarad and the picofarad are in common use

Faraday's laws (1) The laws of *electrolysis* relate to the mass of substance liberated in the process of electrolysis; (2) the law *of electromagnetic induction* relates to the induced *e.m.f.* in a circuit when the *magnetic flux* associated with the circuit changes

ferromagnetic material A material which can be strongly magnetised in the direction of an applied *magnetising force*

field winding A winding on an electrical machine which produces the main magnetic field

frequency The number of oscillations per second of an alternating wave; measured in hertz (Hz)

full-wave rectifier A circuit which converts both the positive and negative half-cycle of an *alternating current* wave into *direct current* (more precisely, unidirectional current)

fundamental frequency The *frequency of* a sinusoidal wave which is the same as that of the complex wave of which it is a part

galvanometer A moving-coil meter used to measure small values of current

generator An electromechanical energy converter which changes mechanical energy into electrical energy

half-wave rectifier Converts one of the half-cycle of an *a.c.* waveform into *direct (unidirectional) current,* but prevents current flow in the other half cycle

hard magnetic material A material which retains much of its magnetism after the *magnetising force* has been removed

harmonic frequency A multiple of the *fundamental frequency* of a complex wave

henry Unit of inductance, symbol H

hertz Unit of *frequency,* symbol Hz; equal to 1 cycle per second

hole A positive charge carrier; can be regarded as the absence of an *electron* where on would normally be found

hysteresis loss Energy loss caused by the repeated reversals of magnetic domains in a *ferromagnetic material* in the presence of an alternating *magnetic field*

impedance Total opposition of a *circuit* to the flow of *alternating current;* symbol Z**,** measured in *ohms*

induced e.m.f. *e.m.f.* induced in a *circuit* either by a changing *magnetic flux* or by a strong electric field

inductance A measure of the ability of a *circuit to* produce a *magnetic field* and store magnetic energy

inductive reactance The opposition of a pure *inductance* to the flow of *alternating current*; no *power* is dissipated in an inductive reactance; symbol X_L , measured in *ohms*

inductor A piece of apparatus having the property of *inductance*

insulator A material which has a very high *resistance* to the flow of electrical *current.* Ideally, no current flows through an insulator

internal resistance The *resistance* 'within' a *cell, battery, generator* or power supply

invertor A circuit which converts direct voltage or *direct current* into alternating voltage or *alternating current*

ion An atom or molecule which is electrically charged; can be either negatively or positively charged

ionisation The process by which an atom is converted into an *ion and electron*

joule The unit of energy equal to 1 watt × 1 second

junction The connection of two or more wires in a circuit; *node* is an alternative name

lamination A thin sheet of iron, many of which are grouped together to form a *magnetic circuit***;** used to reduce *eddy current*

magnetic circuit An interconnected set of ferromagnetic branches in which a *magnetic flux* is established

magnetic coupling coefficient A dimensionless number having a value between zero and unity which gives the proportion of the *magnetic flux* which arrives at a second *(secondary)* coil after leaving the *primary* winding; symbol k

magnetic domain A group of atoms in a *ferromagnetic material* which form a localised magnetic field system

magnetic field intensity The *m.m.f.* per unit length of a *magnetic circuit*; symbol H; measured in ampere-turns per metre or amperes per metre

magnetic flux A measure of the magnetic field produced by a *permanent magnet* or *electromagnet*; symbol Φ; measured in webers (Wb)

magnetic flux density The amount of *magnetic flux* passing through an area of 1 m^2; symbol B, measured in tesla (T)

magnetising force An alternative name for *magnetic field intensity*

magnetomotive force The «force» which produces a *magnetic flux*; symbol *F*, measured in ampere-turns or amperes; abbreviation m.m.f.

mean value The *average value* of an alternating wave

mutual inductance The property of a system which causes a change of *current* in one circuit to induce a *voltage* in another circuit

negative charge carrier An *electron*

non-linear resistor A *resistor* which does not obey *Ohm's law*

***n*-type semiconductor** A *semiconductor* material which has been «doped» so that it has mobile *negative charge carriers*

ohm The unit of electrical *resistance* or *impedance,* symbol Ω

ohmmeter A moving-coil instrument used to measure *resistance*

Ohm's law This states that, at a constant temperature, the *current* in a pure *resistor* is directly proportional to the *p.d.* across it

parallel circuit A circuit in which all the elements have the same *voltage* across them

p.d. Abbreviation for *potential difference*

Peltier effect When a *current* flows in a *circuit* consisting of dissimilar *semiconductors* or metals, the Peltier effect describes why one junction is heated and the other is cooled

periodic time The time taken for one cycle of an *a.c.* wave to be completed

permanent magnet A piece of *ferromagnetic material* which has been permanently magnetised. Both its *remanence* or *retentivity* and its *coercive force* are high

permeability The ratio of the *magnetic flux density* (B) in a material to the *magnetic field intensity* (H) needed to produce it. Also known as the absolute permeability of the material. Symbol μ, measured in henrys per metre (H/m)

permeability of free space The permeability of a vacuum (or, approximately, of air),

symbol $\mu_0 = 4\pi \times 10^{-7}$ H/m

permeability (relative) The ratio of the absolute *permeability* of a magnetic material to the *permeability of free space*; symbol μ_r , and is dimensionless

phase angle The angular difference in degrees or radians between two sinusoidally varying quantities or between two phasors

piezoelectric effect The production of an *e.m.f.* between two faces of a crystal when it is subject to mechanical pressure. The effect is reversible

polarisation A chemical effect in a *cell* which causes the *anode* to be coated with hydrogen bubbles

pole (1) A terminal of a *cell*; (2) one end of a *permanent magnet* or an electromagnet

poly-phase supply An *a.c.* supply having many («poly») phases; the *three-phase supply* is the most popular type

positive charge carrier A *hole*

potential A measure of the ability of a unit charge to produce *current*

potential difference The difference in electrical *potential* between two points in a *circuit*

potentiometer (1) A *resistor* having a sliding contact; (2) a device or *circuit* for comparing electrical *potentials*

power The useful output from an electrical machine and the rate of doing work; symbol *P*, measured in *watts* (W) or joules per second

power factor The ratio in an *a.c.* circuit of the *power* in *watts* to the *apparent power in volt-amperes*

primary cell A *cell* which cannot be recharged

***p*-type semiconductor A** *semiconductor* material which has been «doped» so that it has mobile *positive charge carriers (holes)*

Q-factor The «quality» factor of a *resonant circuit;* it indicates, in a *series resonant circuit,* the value of the *voltage* «magnification» factor and, in a *parallel resonant circuit,* the value of the *current* «magnification» factor

radian An angular measure given by the ratio of the arc length to the radius; there are 2π radians in a circle

reactance The property of a reactive element, that is, a pure *capacitor* or a pure *inductor,* to oppose the flow of *alternating current; power* is not consumed by a reactive element

reactive volt-ampere Also known as reactive «power»; associated with *current* flow in a reactive element; «real» power is not absorbed; symbol Q, measured in volt-amperes reactive (VAr)

rectifier A circuit which converts alternating voltage or current into direct (unidirectional) voltage or current

rejector circuit A *parallel resonant circuit* which has a very high *resistance* to *current* flow at the *resonant frequency,* that is, it «rejects» current

reluctance The ratio of the *magnetomotive force* (F) in a *magnetic circuit* to the *magnetic flux* (Φ) in the circuit; it is the effective resistance of the circuit to magnetic flux; symbol *S*, measured in ampere-turns per weber or in amperes per weber

remanence The remaining *magnetic flux* in a specimen of magnetic material after the *magnetising force* has been removed; also known as the *residual magnetism* or *retentivity*

residual magnetism Another name for *remanence*

resistance A measure of the ability of a material to oppose the flow of *current* through it; symbol *R*, measured in ohms

resistivity The *resistance* of a unit cube of material, calculated by resistance×area/length. Symbol ρ, measured in ohm meters (Ω·m)

resistor A circuit element having the property of *resistance*

resonance The condition of an *a.c.* circuit when it «resounds» or resonates in sympathy with the supply *frequency;* the *impedance of* the circuit at this frequency is purely *resistive*

resonant frequency The *frequency* at which the circuit resonates. Symbol ω_0 (rad/s) or f_0 (Hz)

retentivity Another name for *remanence*

rheostat A variable *resistor*

r.m.s. Abbreviation for *root-mean-square*

root-mean-square The *a.c.* value which has the same heating effect as the equivalent *d.c.* value; abbreviated to *r.m.s.* and also known as the «effective value»

saturation (magnetic) The state of a *ferromagnetic material* when all its *domains* are aligned in one direction

secondary cell A *cell* which can be recharged by passing *d.c.* through it

secondary winding The winding of a *transformer* which is connected to the electrical load

Seebeck effect The *e.m.f.* between two dissimilar metals when their junctions are at different temperatures

self-inductance An alternative name for *inductance*

semiconductor A material whose *conductivity* is mid-way between that of a good *conductor* and that of a good *insulator*

semiconductor junction A junction between an *n-type semiconductor* and a *p-type semiconductor,* a *diode* has one *p-n* junction, and a junction *transistor* has two *p-n* junctions

series circuit A circuit in which all the elements carry the same current

series resonant circuit An *a.c. series circuit* containing *reactive* elements which *resonates* with the supply *frequency.* Known as an *acceptor circuit,* it has a low *impedance* at resonance, so that the resonant current is high, i.e., it 'accepts' *current.* The *voltage* across each of the *reactive* elements (*inductance* and *capacitance*) is higher than the supply *voltage*

shunt An alternative name for *parallel connection*

soft magnetic material A *magnetic material* which easily loses its magnetism ; its *coercive force* is low

solenoid A coil with an air core

Определения некоторых символов и единиц:

DEFINITIONS OF SOME SYMBOLS AND UNITS

A, a – area in m^2
B – magnetic flux density in tesla (T)
C – capacitance in farads (F)
C – unit of electrical charge (coulombs)
D – electric flux density in coulombs per square meter (C/m^2)
d – diameter and distance in metres (m)
E, e – e.m.f. or p.d. in volts (V)
E – electric field intensity or potential gradient in volts per metre (V/m)
e – base of Naperian logarithms = 2.71828
F – magnetomotive force in ampere-turns or in amperes (A)
F – mechanical force in newtons (N)
F – unit of capacitance (farads)
f – frequency in hertz (Hz)
f_0 – resonant frequency in hertz (Hz)
G – conductance in Siemens (S)
H – magnetic field intensity or magnetising force in ampere-turns per metre or amperes per metre (A/m)
H – unit of inductance (henrys)
I, i – current in amperes (A)
j – imaginary operator (complex numbers)
k – magnetic circuit coupling coefficient (dimensionless)
L – self-inductance of a magnetic circuit in henrys (H)
l – length in metres (m)
M – mutual inductance between magnetic circuits in henrys (H)
N – number of turns on a coil
N, n – speed of rotation of the rotating part of a motor in revolutions per minutes (rev/min) or revolutions per second (rev/s)
P – power in watts (W)
Q – electric charge of electrostatic flux in coulombs (C)
Q – reactive volt-amperes (VAr) in an a.c. circuit
R, r – resistance in ohms (Ω)
S – magnetic circuit reluctance (resistance to flux) in ampere-turns per weber or amperes per weber (A/Wb)
S – volt-amperes (VA) in an a.c. circuit
T – periodic time of an alternating wave in seconds (s)
t – time in seconds (s)

V, v – voltage or p.d. in volts (V)
W – energy in joules (J) or in watt seconds (W s)
$\mathbf{X_C}$ – capacitive reactance in ohms (Ω)
$\mathbf{X_L}$ – inductive reactance in ohms (Ω)
Z – impedance of an a.c. circuit in ohms (Ω)
α – temperature coefficient of resistance in $(°C)^{-1}$
ε – absolute permittivity of a dielectric in farads per metre (F/m)
ε_0 – permittivity of free space = 8.85×10^{-12} F/m
ε_r – relative permittivity of a dielectric (dimensionless)
η – efficiency of an electrical machine
θ – temperature in °C or K
θ – angular measurement in degrees or radians
μ – absolute permeability of a magnetic material in henrys per metre (H/m)
μ_0 – permeability of free space = $4\pi \times 10^{-7}$ H/m
μ_r – relative permeability (dimensionless)
π – a constant = 3.142
ρ – resistivity of an electrical conductor in ohm metres (Ω m)
σ – conductivity of a conductor in Siemens per metre (S/m)
χ, $\mathbf{X_m}$ – magnetic susceptibility (dimensionless); it is ratio of the magnetic polarization J divided by the magnetic flax density; the relative permeability μ_r and the magnetic susceptibility χ are connected by: $\mu_r = 1 + \chi$
Φ – magnetic flux in webers (Wb)
ω – angular frequency in rad/s of an a.c. supply
ω – speed of rotation of the rotating part of an electric machine in rad/s
ω_0 – resonant frequency in rad/s
∞ – infinity symbol

Используемая литература:

1. Лахмаков В.Л., Английский язык для электротехнических специальностей: учебное пособие/ В.Л. Лахмаков. – Москва: КНОРУС, 2021 – 192 с. – (Среднее профессиональное образование).

2. www.pmt.education

3. Коваленко И. Ю. Английский язык для инженеров: учебник и практикум для среднего профессионального образования / И.Ю. Коваленко. – Москва: Издательство Юрайт, 2023. – 278 с. – (Профессиональное образование). – Текст: непосредственный.

4. www.multitran.ru

5. https://chennaiuniform.com/electrician-work-shirts/

6. www.alamy.com

7. www.ebdmedicine.com