Государственное бюджетное профессиональное образовательное учреждение
Республики Крым
«Керченский морской технический колледж»

МЕТОДИЧЕСКОЕ ПОСОБИЕ

для студентов II курса
специальности 22.02.06 «Сварочное производство»
по дисциплине
«ИНОСТРАННЫЙ ЯЗЫК»

Керчь
2021

Организация-разработчик: Государственное бюджетное профессиональное образовательное учреждение Республики Крым «Керченский морской технический колледж»

Разработчик: Максименко Ксения Александровна, преподаватель первой категории ГБП ОУ РК «КМТК».

Рассмотрено, одобрено и рекомендовано к утверждению на заседании МО преподавателей СГД.
Протокол № ____ от «___» _____ 2021 г.
Председатель МО _____М.М. Дубовицкая

Содержание

ВВЕДЕНИЕ

Методическое пособие по дисциплине «Иностранный язык» предназначено для студентов ГБП ОУ РК «КМТК» II курса, обучающихся по специальности 22.02.06 «Сварочное производство».

В разработке предоставлен необходимый материал для организации практических занятий по дисциплине «Иностранный язык»: перечень слов, необходимых для усвоения после каждой темы, тексты профессиональной направленности, упражнения, а также контрольные работы.

Целью данной методической разработки является обучение чтению оригинальной литературы по специальности, а также текстов общенаучного содержания и инструктивного характера. Задания позволяют проводить работу по формированию и развитию лексических и грамматических навыков, развитию речевых умений.

Данное методическое пособие может использоваться на практических занятиях по иностранному языку, для самостоятельной работы студентов, а также может пригодиться при подготовке к промежуточной аттестации или текущему контролю.

ТЕМА 1. Понятие сварки. Профессия сварщика. Сферы работы сварщика

1. Выучите слова и выражения; при необходимости проверьте транскрипцию:

1.	equipment	оборудование
2.	(to) join	шов, соединять
3.	to melt	плавить
4.	oil	нефть
5.	to repair	ремонтировать
6.	mining	горное дело, добыча полезных ископаемых
7.	extraction	извлечение, добыча
8.	strong bond	прочная связь
9.	to weld welding welder	варить сварка сварщик
10.	alloy	сплав
11.	medical restriction	медицинское ограничение
12.	full-time work	полный рабочий день
13.	shift work	сменная работа
14.	safety measures	меры безопасности
15.	(welding) torch	(сварочная) горелка
16.	to add addition	добавлять добавление
17.	molten	расплавленный
18.	iron	железо
19.	steel	сталь
20.	shipbuilding plant	судостроительный завод залив
21.	shipyard	судоверфь
22.	skilled	квалифицированный
23.	arc	дуга
24.	property	свойство
25.	non-ferrous	цветной (о металле)

2. Прочтите интернациональные слова и найдите их русские эквиваленты:

Metal, mechanical, pressure, process, intense, electric, energy, transform, temperature, concentration, industrial, zone, base, electrode, stability, factor, type, polarity, generator, special, transformer, voltage, amperage, reduce, crater, inspect, regular, cable, form, compensate, portion, contact, distance, absorb, ultraviolet, component, gas, ionize, discuss, proportion.

3. Прочитайте и переведите текст:

The profession of a welder: general information

History of the profession

Profession welder appeared in 1802 year when Russian scientist Petrov managed to open the effect of the electric arc, which is able to create very high temperatures. She was so high, this made even melt metal.

Professional holiday

The last Friday of May is the day, when welders began to celebrate their professional holiday. This day was chosen for a reason, it's the last day of spring, and ahead of hot summer. And in the summer begin repairs and construction, which become possible due to the welding.

Day of the Welder is the unofficial holiday, it is not a red day in the calendar, but in the soul of each welder it burns with a bright flame.

The pros and cons

To work as a welder quite profitable:

- high salaries, especially welders with higher categories and experience;
- getting a higher education is not necessary;
- the profession is in high demand in the labour market because the job of a welder is needed almost always.

But there are also negative sides of this profession:

- dangerous and hard work, sometimes welders have to work at a great height, and in a variety of extreme conditions;
- tired of its monotony;
- strong eye strain, because welding occurs when high-brightness radiation;
- perhaps the emergence of certain occupational diseases.

So to be a welder, you must not have medical contraindications.

Requirements for the role. To work as a welder, you need:

- have experience;
- document, which confirms qualification;
- to work with necessary tools.
- Welcome skills on machine tools.

Job responsibilities. The duties of a welder:

- to produce quality products;
- plan your work;
- follow safety conditions;
- to make an order for products, material for further work;
- assistance in the organization of work, which can increase the level of productivity.

Also, these professionals can participate in research, aimed at improving techniques and methods of work.

The features of the profession

Who is a welder? A welder is a worker. His job involves working in the welding industry. This worker connects all kinds of metal structures, details, products, tanks and pipes.

Therefore, the work of the welder must be very accurate and professional. Because of his professionalism depends on the quality of work. Even one error in the work of the experts may lead to bad consequences.

To protect yourself and to protect your face and eyes, welders should always follow the safety precaution and use special masks. This mask allows to suppress the bright flame and sparks, which face workers.

Our century is the era of new technologies, which is based on metal. It is used almost everywhere. Life, industry, construction and many other areas need it. Industry experts are very valuable, welding work is always required.

Professional skills

But if you are already sure, what you want to become a welder, you need to know:

- electrical engineering and technology ;
- gas properties;
- methods and principles of operation of the equipment used;
- instruction on labor protection and safety;
- chemistry, physics.

Every day workers perform welding, and are subjected to various threats: injury, damage to the eyes as well as the threat of electric shock.
Mostly welders injured as a result of neglect of precautions. To avoid this, you must strictly follow safety measures.

The personal qualities of a welder

Welding can be carried out in dangerous and extreme conditions: at the height or during rain and snow storms.
And the ability to be able to focus is one of the most important qualities, because the work requires concentration and caution. The specialist also needs excellent eyesight.
Profession requires balance and patience, after all, the situation can be very different, but showing these qualities, you can avoid any problem.

The career of a welder

The profession of a welder is considered to be in demand today. There are plenty of opportunities, to move up the career ladder. Setting a goal, a specialist will easily be able to take leadership positions.

In the vacancies of welder in our time, the deficit is not observed. They can easily find work in:

- private organizations;
- areas of service;
- construction sites;
- industrial plants and factories.

The answer to this question depends on a number of factors: from region, experience and from the place of work. If the specialist is hardworking and constantly improving their skills, his income grows.
To become a welder, it is enough to finish vocational school, technical school or College. Sometimes all you have is to undergo training directly at the workplace or at specialized courses. Hard work, irresistible desire, valuable experience and absence of medical contraindications, will certainly help to achieve considerable success in this area.

4. Ответьте на вопросы: «Профессия сварщика – это моё?»

1. Are you good at preparing and planning a job from start to finish?	Yes	No
2. Can you look at a diagram or shop drawing and visualize how things come together?	Yes	No
3. Do you like figuring out what's wrong with something and then repairing it?	Yes	No
4. Are you able to bend, stretch, kneel, stand for long periods and lift material and supplies?	Yes	No
5. Would it bother you to work around dangerous gases and intense heat?	Yes	No
6. Do you have good hand/eye coordination to guide a welding arc along the edges of metal?	Yes	No

If you answered «Yes» to most of these questions, welder may be for you!

5. Подумайте и ответьте на следующие вопросы:

1. Why have you chosen the profession of a welder?
2. Where do you study?
3. Do you enjoy the course?
4. What traits of character should a welder have?
5. How long should a person be trained to become a skilled welder?
6. Do you think that a welder should be able to use all kinds of welding?
7. What is more interesting to you personally: welding techniques, welding inspection (other)?

6. Прочитайте и переведите текст:

Welding

Welding is a process when metal parts are joined together by the application of heat, pressure, or a combination of both. The processes of welding can be divided into two main groups:

• pressure welding, when the weld is achieved by pressure and

• heat welding, when the weld is achieved by heat. Heat welding is the most common welding process used today.

Nowadays welding is used instead of bolting and riveting in the construction of many types of structures, including bridges, buildings, and ships. It is also a basic process in the manufacture of machinery and in the motor and aircraft industries. It is necessary almost in all productions where metals are used.

The welding process depends greatly on the properties of the metals, the purpose of their application and the available equipment. Welding processes are classified according to the sources of heat and pressure used: gas welding, arc welding, and resistance welding. Other joining processes are laser welding, and electron-beam welding.

7. Ответьте на вопросы:

1. How can a process of welding be defined?
2. What are the two main groups of processes of welding?
3. How can we join metal parts together?
4. What is welding used for nowadays?
5. Where is welding necessary?
6. What do the welding processes of today include?

8. Найдите в тексте английские эквиваленты:

1. Сегодня сварка используется вместо соединения болтами.
2. Сварочный процесс в основном зависит от свойств металла.
3. Она необходима почти во всех производствах, где используется металл.
4. Сварка нагреванием – самый распространенный процесс сварки сегодня.
5. Это основной процесс в машиностроении.

9. Дополните предложения, опираясь на текст:

1. …… are laser welding, and electron-beam welding.
2. …… in all productions where metals are used.
3. …… on the properties of the metals.
4. …… or a combination of both.
5. …… when the weld is achieved by heat.

10. Найдите 8 слов, связанных со сваркой, и выпишите их:

H E A T Q J Z P

D F G G H O C A

X C V T G I F R

W E L D I N G T

V B A N N M A R

A W S E S X S F

R S E S C E H V

C X R M E T A L

11. Выполнить контрольную работу:

I. Match the words to make up the expression:

1	shipbuilding	a	welder
2	to become a	b	workshop
3	strong	c	arc
4	to join	d	extraction
5	to repair	e	materials
6	to weld in the	f	welding
7	WorldSkills	g	equipment
8	bridge	h	competition
9	oil	i	bond
10	underwater	j	steel
11	to be made of	k	plant
12	electric	l	construction

II. Fill in the table using the given words:
join, steel, welding engineer, gold, use, weld, metal, developer, electrode, repair, iron, operator, produce, welding instructor, welding machine, welder, welding robot, extract, melt, gas, form, torch, add, welding station, plastic

Equipment	*Activity*	*Material*	*Profession*

III. Translate the sentences into Russian:
1. Welding can be carried out in dangerous and extreme conditions: at the height or during rain and snow storms.
2. Hard work, interest, valuable experience and absence of medical restrictions will help to achieve considerable success in this area.
3. Most welders work full-time, sometimes in shift work or self-employed; indoors or outdoors.
4. The last Friday of May is the day when welders begin to celebrate their professional holiday.

5. In 1802 a Russian scientist opened the effect of the electric arc which is able to create very high temperatures.
6. A good specialist must know technology in melting metals, metal properties, principles of equipment operation, safety measures and knowledge of physics and chemistry.

IV. Translate the sentences and expressions into English:

a) 1. Мой дядя – квалифицированный сварщик.
2. Эти металлы несвариваемые, я не могу их сварить.
3. Использование сварки в повседневной жизни практически безгранично.
4. Я вижу здесь дефект, перевари этот шов еще раз.
5. Стали классифицируются по (according to) свариваемости.
6. Мне нравятся сварные конструкции, потому что они прочные.

b) 1. Низкоквалифицированный рабочий 2. Добыча полезных ископаемых. 3. Расплавленный металл. 4.Цветные металлы. 5. Высокие температуры. 6. Прочная связь.

V. Fill in the gaps using the words from the box:

concentrate, metals, hard-working, form, masks, holes, demand, medical, ladder, dangerous, eyesight, income

A welder is a worker who joins (1) _____together, or fills and repairs (2) _____ on metal constructions. Welders need good (3)_____, manual dexterity and coordination. They should also be able to (4)_____ for long periods of time on very detailed work, as well as be in good physical (5) _____. The profession of a welder is considered to be in (6) _____ today. There are plenty of opportunities to move up the career (7) _____. If the specialist is (8) _____and constantly improving their skills his (9)_____ grows. But this profession is very (10)_____. To protect face and eyes welders should always use special (11)_____. To be a welder you must not have (12) _____ restrictions.

ТЕМА 2. Металлы и их свойства

1. Выучите слова и выражения; при необходимости проверьте транскрипцию:

1.	copper	медь
2.	lead	свинец
3.	ore	руда
4.	precious	драгоценный
5.	silver	серебро
6.	mercury	ртуть
7.	amount	количество
8.	to be rich in	быть богатым (чем-либо)
9.	advantages and disadvantages	преимущества и недостатки
10.	drawback	недостаток
11.	resistant	устойчивый
12.	rust	ржавчина, коррозия
13.	liquid	жидкость
14.	compatible	совместимый
15.	workshop	мастерская
16.	longevity	долговечность
17.	to treat treated	обрабатывать обработанный

	treatment	обработка
18.	expensive	дорогой
19.	to possess	владеть
20.	conductivity	проводимость
21.	surface	поверхность
22.	solid	твердый
23.	to bend	сгибать
24.	shape	форма
25.	size	размер
26.	pure	чистый
27.	melting point	точка плавления

2. Прочитайте и переведите текст:

METALS

Metals are materials most widely used in industry because of their *properties*. The study of the production and properties of metals is known as metallurgy.

The separation between the atoms in metals is small, so most metals are *dense*. The atoms are *arranged* regularly and can slide over each other. That is why metals are *malleable* (can be deformed and bent without fracture) and *ductile* (can be *drawn* into *wire*). Metals vary greatly in their properties. For example, *lead* is soft and can be *bent* by hand, while *iron* can only be worked by *hammering* at red heat.

The regular arrangement of atoms in metals gives them a crystalline structure. Irregular crystals are called *grains*. The properties of the metals depend on the size, shape, orientation, and composition of these grains. In general, a metal with small grains will be harder and stronger than one with *coarse* grains.

Heat *treatment* such as *quenching*, *tempering*, or *annealing* controls the nature of grains and their size in the metal. Small amounts of other metals (less than 1 per cent) are often added to a pure metal. This is called *alloying* and it changes the grain structure and properties of metals.

All metals can be formed by drawing, *rolling*, hammering and *extrusion*, but some require hot-working. Metals *are subjected* to metal *fatigue* and to *creep (*the slow increase in length under *stress*) causing deformation and *failure*. Both effects are taken into account by engineers when designing, for example, airplanes, gas turbines and pressure vessels for high-temperature chemical processes. Metals can be worked using machine-tools such as *lathe*, *milling machine*, *shaper* and *grinder*.

The ways of working a metal depend on its properties. Many metals can be *melted* and *cast* in *moulds*, but special conditions are required for metals that react with air.

3. Переведите интернациональные слова без словаря:

Metal; material; industry; metallurgy; atom; crystal; structure; orientation; gas; turbines; temperature; chemical; process; special.

4. Образуйте новые слова путем прибавления суффиксов к следующим словам. Полученные слова переведите:

-*ly* (adverbs): wide; regular; great; hard; strong; natural; high; chemical;

-*er* (nouns): to work; to produce; to slide; to heat; to control; engine; to design; to shape; to grind.

5. Найдите переводы для следующих слов:

1. Property	а) располагать (организовывать)
2. separation	б) проволока
3. dense	в) повреждение
4. arrange	г) токарный станок
5. malleable	д) свойство
6. fracture	е) отпуск после закалки
7. draw	ё) ползучесть
8. wire	ж) станок
9. quenching	з) плотный
10. tempering	и) сосуд под давлением
11. annealing	к) ковкий, податливый
12. alloying	л) фрезерный станок
13. rolling	м) отжиг
14. extrusion	н) ломать
15. fatigue	о) строгальный станок
16. creep	п) легирование
17. failure	р) усталость металла
18. machine-tool	с) волочить, тянуть
19. lathe	т) отделение
20. milling machine	у) шлифовальный станок
21. shaper	ф) экструзия
22. grinder	х) закалка
23. pressure vessel	ц) прокатка

6. Найдите лишнее слово:

a) Lead; copper; rubber; zinc; iron; tin; silver.
b) To remember; to build; to deform; to bend; to draw; to hammer; to weld.
c) Size; shape; orientation; production; composition.

7. Распределите слова по колонкам в соответствии с их частью речи:

noun	Verb	adjective	adverb

Treatment; widely; separation; dense; slide; ductile; regularly; fracture; vary; soft; arrangement; crystal; crystalline; grain; coarse; add; pure; require; long; length; width; wide; cause; pressure; depend; melt; react; condition.

8. Запишите три формы глаголов, используя пример. Переведите их на русский:
Model: to know (знать) – knew (знал) – known (известный) – knowing (знающий)
To use; to study; to bend; to draw; to work; to depend; to control; to add; to require; to design; to cast.

9. Найдите в тексте английские эквиваленты следующих выражений:
1) благодаря своим свойствам; 2) металлы можно сгибать, не ломая; 3) можно вытягивать в проволоку; 4) сильно отличаться; 5) обрабатывать молотом при красном калении; 6) упорядоченное расположение атомов; 7) ориентация и расположение атомов; 8) тепловая обработка; 9) небольшие количества; 10) чистый металл; 11) металлы подвержены усталости и ползучести; 12) принимать во внимание при конструировании;13) сосуды, работающие под давлением, для химических процессов при высокой температуре; 14) металлы можно обрабатывать, используя станки.

10. Соотнесите начало и конец предложения:

1. Metals are materials most widely used in industry …	a) a crystalline structure.
2. The separation between the atoms in metals is small, …	b) they are ductile.
3. As the metals can be deformed and bent without fracture …	c) so most metals are *dense*.
4. As the metals can be drawn into wire …	d) the size, shape, orientation, and composition of these grains.
5. The regular arrangement of atoms in metals gives them …	e) by hand.
6. The properties of the metals depend on …	f) because of their *properties*.
7. Lead is soft and can be bent …	g) causing deformation and failure.
8. Metals are subjected to metal fatigue and to creep …	h) they are malleable.

11. Ответьте на вопросы:

1. What are metals?
2. What do we call metallurgy?
3. Why are most metals dense?
4. Why are metals malleable?
5. What is malleability?
6. What are grains?
7. What is alloying?
8. What is crystalline structure?
9. What do the properties of metals depend on?
10. What changes the size of grains in metals?
11. What are the main processes of metal forming?
12. How are metals worked?
13. What is creeping?

12. Выполнить контрольную работу:

I. Match the words to make up the expression:

1.	silver-white	a) ore
2.	boiling	b) electrons
3.	physical	c) wires
4.	movement of	d) point
5.	mineral	e) disadvantages
6.	precious	f) patina
7.	periodic	g) resources
8.	good conductor of	h) heat
9.	electrical	i) table
10.	Advantages and	j) properties
11.	To be resistant to	k) metals
12.	iron	l) rust

II. Translate the sentences into Russian:

1. The best conductors of electricity are silver and copper, however, lead and mercury are poor conductors of electricity.
2. Metals vary greatly in their properties: for example, lead is soft and can be bent by hand, while iron can only be treated by hammering at red heat (каление).

3. By making alloys, we can change the properties of a metal to suit our particular needs.
4. There are two types of extracting metals: surface mining that is used when the mineral is near the surface and underground mining - when the mineral is deep below the surface.
5. **Non-ferrous metals** are metals that don't contain iron; they have a lot of uses but they are often expensive because they are more difficult to extract.
6. Metals such as iron are very strong so they are widely used in the construction of buildings, bridges, railway lines, vehicles and machinery.

III. Translate the sentences into English:
1 Металлы – хорошие проводники тепла, звука и электричества.
2. Ртуть имеет жидкое состояние (state) при комнатной температуре.
3. Металлы имеют высокую точку плавления.
4. Алюминий дешевый, легкий и устойчив к коррозии.
5. Золото и серебро – драгоценные металлы.
6. Какие преимущества и недостатки в использовании меди?

IV. Find the odd word:
1. Gold; copper; zinc; lead; steel, silver. 2. To melt; to deform; to bend; to remember; to hammer; to weld. 3. Carbon, selenium, sulphur, phosphorous, sodium. 4. Iron, platina, cobalt, nickel. 5. Copper, titanium, silver, zinc, aluminium. 6. Sodium, potassium, magnesium, helium, beryllium.

V. Fill in the gaps using the words from the box:

corrosion, reactive, jewelry, solid, pure, shipbuilding, bells, surface, air, nonmetal, oxygen, iron

1. All metals except Mercury, exist in the _____(1) form at room temperature. 2. Metals are sonorous. Therefore, they are used for making _____(2). 3. Potassium and sodium are the most _____ (3) metals. They react with _____(4) and water. 4. Some metals can be found in a _____(5) form. 5. Steel, for example, is a mixture of _____(6) and small amounts of carbon and other elements. 6. Bronze is used frequently in _____ (7) because it is resistant to _____ (8) from sea water. 7. White gold, which is popular for _____ (9), is an alloy of gold and platinum or palladium. 8. When _____(10) reacts with a metal, it forms an **oxide** on the _____(11) of the metal. 9. **A** _____ (12) is an element that does not have the properties of a metal.

ТЕМА 3. Сталь и алюминий. Их свойства

1. Выучите слова и выражения; при необходимости проверьте транскрипцию:

1.	carbon	углерод
2.	to contain	содержать
3.	brittle	хрупкий, ломкий
4.	ductile	ковкий, податливый
5.	malleability	ковкость, податливость
6.	useful	полезный
7.	to forge forging	ковать ковка
8.	heating heat	нагревание тепло
9.	spring	пружина

10.	to cut	резать
11.	stainless steel	нержавеющая сталь
12.	to prevent	предотвращать
13.	nitrogen	азот
14.	silicon	кремний
15.	increase/decrease	увеличивать(ся)/уменьшать(ся)
16.	application	применение
17.	foil	фольга
18.	recycle	перерабатывать
19.	excellent	отличный
20.	strength	сила, прочность
21.	low/high	низкий/высокий
22.	machining	(машино)обработка
23.	layer	слой
24.	composition	состав, структура
25.	per cent	процент
26.	wear resistance	износостойкость
27.	poor	бедный, плохой

2. Прочитайте и переведите текст:

Steel

The most important metal in industry is iron and its alloy — steel. Steel is an alloy of iron and carbon. It is strong and stiff, but corrodes easily through rusting, although stainless and other special steels resist corrosion. The amount of carbon in a steel influences its properties considerably. Steels of low carbon content (mild steels) are quite ductile and are used in the manufacture of sheet iron, wire, and pipes. Medium-carbon steels containing from 0.2 to 0.4 per cent carbon are tougher and stronger and are used as structural steels. Both mild and medium-carbon steels are suitable for forging and welding. High-carbon steels contain from 0.4 to 1.5 per cent carbon, are hard and brittle and are used in cutting tools, surgical instruments, razor blades and springs. Tool steel, also called silver steel, contains about 1 per cent carbon and is strengthened and toughened by quenching and tempering.

The inclusion of other elements affects the properties of the steel. Manganese gives extra strength and toughness. Steel containing 4 per cent silicon is used for transformer cores or electromagnets because it has large grains acting like small magnets. The addition of chromium gives extra strength and corrosion resistance, so we can get rust-proof steels. Heating in the presence of carbon or nitrogen-rich materials is used to form a hard surface on steel (case-hardening). High-speed steels, which are extremely important in machine-tools, contain chromium and tungsten plus smaller amounts of vanadium, molybdenum and other metals.

3. Найдите в тексте ответы на вопросы:

1. What is steel?
2. What are the main properties of steel?
3. What are the drawbacks of steel?
4. What kinds of steel do you know? Where are they used?
5. What gives the addition of manganese, silicon and chromium to steel?
6. What can be made of mild steels (medium-carbon steels, high-carbon steels)?
7. What kind of steels can be forged and welded?
8. How can we get rust-proof (stainless) steel?
9. What is used to form a hard surface on steel?

10. What are high-speed steels alloyed with?

4. Найдите эти слова и выражения в тексте:

1. сплав железа и углерода
2. прочный и жесткий
3. легко коррозирует
4. нержавеющая сталь
5. низкое содержание углерода
6. ковкость
7. листовое железо, проволока, трубы
8. конструкционные стали
9. пригодны для ковки и сварки
10. твердый и хрупкий
11. режущие инструменты
12. хирургические инструменты
13. инструментальная сталь
14.упрочнять
15. добавление марганца (кремния, хрома, вольфрама, молибдена, ванадия)

5. Прочитайте и переведите текст:

Aluminum

Aluminium is the most common metal on Earth. It occurs naturally in many different kinds of rocks. But most of the aluminium we use is extracted from an ore called bauxite, which is formed over long periods by the weathering of rocks containing aluminium silicates (aluminium, silicon and oxygen).

Aluminium is extracted from bauxite by the Bayer process and electrolysis. In the Bayer process, bauxite is mixed with caustic soda and heated. This produces sugar-like crystals of pure aluminium oxide. These are dissolved in molten sodium aluminium fluoride, called cryolite. Electrolysis is then used to split up the aluminium and oxygen.

In 1886 two chemists independently discovered how to extract aluminium using electricity. Their discovery reduced the price of aluminium to a fraction of the price of silver in four years. The two chemists were Charles Martin Hall (1863 - 1914), a student at Oberlin College in the USA, and P.L.T. Heroult (1863 - 1914), a young chemist working in France. By coincidence, they were not only the same age when they made their discovery, but also died within eight months of each other.

Before this, the metal was much more expensive than silver and gold. The Emperor of France, Napoleon III, for example, used aluminium plates to impress the most important guests. Today we use aluminium foil to wrap food because it is so cheap.

Aluminium is also durable, light and a good conductor of electricity. It is used to protect metals against corroding because when the surface of aluminium reacts with oxygen in the air, a thick coating of aluminium oxide forms that seals a metal from the air. It is also used to make parts for planes, cars, and lorries, to make electric cables.

6. Найдите в тексте английские эквиваленты:

самый распространенный металл; бокситы; добывать из; фтористое соединение; криолит; разлагать; хороший проводник электричества; предохранять металлы от ржавчины; поверхность; покрытие; понизить цену до.

7. Найдите переводы следующих выражений:

1. it occurs naturally а). в течение долгого времени

2. over long periods	b). они - ровесники
3. sugar-like	c). алюминиевая фольга
4. by coincidence	d). чистая окись алюминия
5. they are the same age	e). защищать металл от доступа воздуха
6. to seal a metal from the air	f). по случайному стечению обстоятельств (случайно)
7. aluminium foil	g). встречается в природе
8. pure aluminium oxide	h). похожий на сахар

8. Ответьте на вопросы:

1. Where does aluminium occur naturally?
2. Was aluminium always a cheap metal?
3. What reduced the price of aluminium?
4. What are the properties of aluminium?
5. Is aluminium widely used and where?

9. Перефразируйте следующие предложения, используя слова курсивом:

1. Aluminium is drawn out from bauxite by the Bayer process.
2. We use aluminium to shield metals from corroding.
3. Aluminium is found mainly in bauxite.
4. Aluminium used to be a very dear metal before two chemists opened how to extract it using electricity.
5. Aluminium oxide encloses a metal securely from the air.

Occur, discover, extract, expensive, protect , seal

10. Переведите предложения:

1. Aluminium alloys can possess the strength of steel, though only a third the weight. 2. Cows give more milk when there are cool, heat-reflecting aluminium roofs on their dairy barns. 3. Aluminium offers a bright hope for energy conservation. 4. In direct contact with a heat source, aluminium is an excellent conductor. 5. World's lightweight champion in the long-distance transport of electricity, aluminium, has virtually replaced heavier copper in high-voltage power lines. 6. Nearly indestructible, aluminium can be remelted over and over. 7. Aluminium is alloyed with small amounts of other metals. 8. Copper adds strength; magnesium imparts additional marine-corrosion resistance.

11. Выполнить контрольную работу:

I. Match the words to make up the expression:

1. per	a) deformation
2. stainless	b) environment
3. wear	c) number
4. resistant to	d) resistance
5. cutting	e) symbol
6. atomic	f) cent
7. chemical	g) conductivity
8. acid	h) temperatures
9. magnetic	i) steel
10. electrical	j) fields
11. low	k) layer

12. thin l) tool

II. Translate the sentences into Russian:

1. Low-carbon steel is malleable and not brittle; it is widely used in construction, in automobile body panels and in making wires.
2. Medium-carbon steel has good wear resistance; it is often used for automobile parts.
3. High-carbon steel becomes harder after heating and has excellent wear resistance; it is used to make springs and high-strength wires.
4. Pure iron mixed with carbon is the main element of stainless steel; added chromium makes it resistant to rust.
5. Stainless steel is used in transport, surgical instruments, knives, shipbuilding; it is also used in oil, gas, nuclear and aerospace industries.
6. The creator of stainless steel was experimenting with different types of steel for weapons and noticed that 13% chromium steel had not corroded after several months.

III. Translate the sentences into English:

1. Алюминий – отличный проводник тепла и электричества.
2. Украшения, сделанные из нержавеющей стали, очень популярны.
3. Сталь – это сплав железа и углерода.
4. Добавление хрома делает сталь нержавеющей.
5. После железа алюминий – второй самый широко используемый металл в мире.
6. Радиаторы сделаны из алюминия, т.к. его теплопроводность очень хорошая.

IV. Fill in the gaps using the words from the box:

foil, braze, oxide, SS, decreases, non-magnetic, application, drilling, properties, drawback, ultrahigh-carbon, types

1. It is impossible to _____ aluminium. 2. There are five major _____ of stainless steel. 3. The abbreviation of stainless steel in engineering is _____. 4. Aluminium is _____. 5. Machining methods, such as cutting, _____ and bending, work with aluminium easily. 6. Aluminium _____ is used in packaging products. 7. Aluminium has a thin layer of _____, which protects it from damages. 8. Cutting tools are made from _____ steel. 9. Stainless steel is widely used in industrial and non-industrial _____. 10. The _____ of aluminium include low density, low weight, high strength and easy machining. 11. What is the main _____ of aluminium? 12. At high temperatures aluminium's strength _____.

V. Find 8 antonymous pairs:

drawback, strong, heat, increase, high, cheap, brittle, rich, useless, decrease, advantage, low, poor, cold, useful, expensive

ТЕМА 4. Сварочный процесс и сварочное оборудование

1. Выучите слова и выражения; при необходимости проверьте транскрипцию:

1.	ear defenders	наушники
2.	goggles	защитные очки
3.	measuring tape	измерительная лента
4.	protective face shield	защитный щиток для лица
5.	slag hammer	молоток для очищения шлака
6.	steel-toed boots	ботинки со стальным носком

7.	steel wire brush	щетка из стальной проволоки
8.	welding gloves	перчатки для сварки
9.	welding helmet	сварочный шлем
10.	scraper	скребок
11.	overall	спецодежда, комбинезон
12.	grinding machine	шлифовальный станок, болгарка
13.	consumables	расходные материалы
14.	cut(ting) torch	резак
15.	to protect	защищать
16.	leather	кожа
17.	workbench	верстак, рабочее место
18.	to reduce	ограничивать
19.	spark	искра, вспышка
20.	precise	точный
21.	digital caliper	цифровой штангенциркуль
22.	pliers	плоскогубцы
23.	to smooth	разглаживать, шлифовать
24.	file	напильник
25.	UV (ultraviolet) rays	у/ф лучи
26.	clamp	крепеж, зажим
27.	gear, equipment	принадлежности, оборудование

2. Переведите текст:

Welding process

Welding is a process when metal *parts* are *joined* together by the *application* of *heat, pressure,* or a combination of *both.* The process of welding can be *divided* into two main groups:

- **pressure welding**, when the weld is *achieved* by pressure and
- **heat welding**, when the weld is achieved by heat.

Heat welding is the most *common* welding process used today.

Nowadays welding is used *instead of* bolting and riveting in the construction of many types of structures, including bridges, buildings, and ships. It is also a *basic* process in the *manufacture* of *machinery* and in the motor and aircraft industries. It is *necessary almost* in all *productions* where metals are used.

The welding process *depends* greatly *on* the *properties* of the metals, the *purpose* of their application and the *available equipment*. Welding processes are classified *according to the sources* of heat and pressure used.

The welding processes widely *employed* today *include* **gas welding**, **arc welding**, and **resistance welding**. Other joining processes are **laser welding**, and **electron-*beam* welding.**

3. Переведите следующие интернациональные слова без словаря:

Process; metal; combination; group; bolt; structure; type; motor; industry; classify; gas; laser; electron.

4. Найдите в тексте существительные, образованные от данных глаголов. Переведите их:

To weld; to apply; to combine; to press; to construct; to resist.

5. Соотнесите английские выражения с их переводами:

1. application of heat	a) основной процесс

2. pressure welding 3. heat welding 4. instead of riveting 5. basic process 6. manufacture of machinery 7. aircraft industry 8. arc welding 9. resistance welding 10. electron-beam welding	b) сварка сопротивлением c) самолётостроение d) применение тепла e) электронно-лучевая сварка f) сварка давлением g) дуговая сварка h) вместо заклёпывания i) сварка нагреванием j) производство машинного оборудования

6. Найдите в тексте английские эквиваленты для следующих выражений:
Применение давления; можно достичь; можно разделить; вместо закрепления болтами; мосты и здания; быть необходимым; во многом зависеть от; свойства металлов; цель применения; имеющееся оборудование; широко применяться.

7. Вставьте нужный предлог:

1. Welding is also a basic process … the manufacture … machinery.
2. The welding process depends greatly on the properties of the metals.
3. The welding process allowed Americans to repair their ships quickly after a German attack in the New York Harbor at the beginning of the war
4. Scientists attempted to protect welds from the effects of oxygen and nitrogen in the atmosphere.
5. Electro-slag welding was released in 1958 and was followed by its cousin, electro-gas welding, in 1961.

8. Ответьте на вопросы:

1. What two main groups can the welding process be divided into?
2. What welding process is the most common today?
3. What processes is welding used instead of nowadays?
4. What manufacture is welding a basic process in?
5. What does the welding process greatly depend on?
6. According to what are welding processes classified?
7. What do welding processes widely employed today include?
8. What other joining processes do you know?

9. Прочитайте текст и ответьте на вопросы:

- What essential welding tools do you know?
- What are they used for?

Top 10 Essential Welding Tools

You might have heard that getting into welding is extremely expensive, but the truth is that there are only a couple of essential welding tools that you'll use regularly. Surely, there are plenty of other accessories on the market and more advanced professional tools, but you can start melting metal by equipping your workshop with just these basic items.

1. A welding table or a workbench

Welding on the ground is impractical, uncomfortable, and may even put your safety at risk. Before you start a welding project, you need to find a solid surface to work on. Whether that's a traditional workbench or a dedicated welding table, that's up to you, but don't skimp on this.
There are plenty of small and portable workbenches that can be purchased for a nominal price. Invest in one of those and carry it with you, as it will make your job significantly easier.

2. An auto-dimming helmet

Probably the first item that pops into your mind when you think of welding is the helmet that all welders wear. Without one, you simply can't start welding, so investing in a good quality one is a wise decision.

An auto-dimming helmet will dim the shield only when detecting a bright light, and not all the time like older models of helmets. This way you can see everything more clearly before starting the project, increasing your accuracy and reducing the risk of mistakes.

3. Welding Gloves

When it comes to welding, your safety is paramount so always invest in specialized equipment. Don't go looking for general safety gloves, but purchase specialized welding gloves. Since the temperature of the arc when welding will reach 10,000 degrees, welding gloves are usually really thick, but you'll still feel some heat.

You can also use them to pick hot metal for a few seconds when needed, but don't make a habit out of this as it will ruin them faster.

4. Safety Glasses

When you weld or when you use grinders, sparks and other small pieces of metal fly everywhere, including under your helmet. Invest in a pair of safety glasses and always use them before putting on the helmet.

5. An Angle Grinder

Whether you need them for grinding, for smoothing the weld or cutting a piece of metal, you'll definitively feel handicapped if you try to work without one. Although we always recommend investing in quality tools and angle grinders are no exception, you can also purchase one for as low as $15.

6. Welding Clamps

Welding clamps are essential for keeping your work pieces together so you can weld properly. You'll need plenty of them, depending on how many pieces your project needs.

7. A couple of C Clamps

Even when you use a workbench or a welding table, you still need to secure your workpiece down to the table, and that's being done by using C Clamps. C Clamps come in various shapes and sizes and we recommend buying a couple of them to keep in your workshop, as they come useful in a variety of situations.

8. Measuring Tools

When it comes to welding, every measurement needs to be precise and that requires using dedicated measuring tools. Depending on your project and your preference, this usually means anything from measuring tape, calipers or metal rulers. I personally prefer to use a digital caliper because I find it the easiest and most precise measuring too. And remember the proverb "measure twice, cut (or weld in this case) once".

9. Pliers

Like most of the tools we recommended so far, pliers are essential because of their versatility. It is cheap and effective tool.

10. A metal file

Once your project is finished, after so much cutting and welding you'll see plenty of metal imperfections that you want to smooth out. You can use the angle grinder we mentioned before for the big ones. And for the small ones a metal file is a tool you need. A metal file will allow you to work on smaller pieces and smooth the details more precisely and they are very cheap, to begin with.

Welding can be an extremely interesting hobby or career. For the beginners there's no better way than investing in a couple of essential tools and see how your first project turns out. And if you want more, then you can upgrade to more advanced and expensive welding tools.

10. **Выполнить контрольную работу:**

I. Match the words to make up the expression:

1. slag	a) tape
2. measuring	b) brush
3. digital	c) machine
4. grinding	d) sparks
5. UV	e) shield
6. ear	f) hammer
7. protective face	g) rays
8. steel wire	h) torch
9. steel-toed	i) caliper
10. cutting	j) materials
11. artificial	k) boots
12. splashes and	l) defenders

II. Translate the sentences into Russian:

1. When you weld or when you use grinders, sparks and other small pieces of metal fly everywhere.
2. When it comes to welding, every measurement needs to be precise and that requires using different measuring tools: measuring tape, calipers or metal rulers.
3. There are a lot of advanced professional tools on the market, but you can start welding metal by equipping your workshop with some basic items.
4. Without an auto-dimming helmet, you simply can't start welding, so investing in a good quality one is a wise decision.
5. Keep a couple of C Clamps in your workshop, as they are useful in a variety of situations.
6. You can use welding gloves to pick hot metal for a few seconds when needed, but don't make a habit out of this as it will ruin them faster.

III. Translate the sentences into English:

1. Перед сваркой найдите твердую поверхность – сварочный стол или верстак.
2. Используйте цифровой штангенциркуль, т.к. это самый точный измерительный инструмент.
3. Чтобы защитить свои глаза во время сварки, надевайте защитные очки.
4. Чтобы защитить ступни, носите ботинки со стальным носком.
5. Основные сварочные инструменты для начинающих: верстак, сварочный шлем, сварочные перчатки, защитные очки, шлифовальный станок, зажимы, измерительные инструменты, плоскогубцы, напильник.
6. Перчатки отличные: они надежные и сделаны из кожи.

IV. Fill in the gaps using the words from the box:

proverb, dim, investment, portable, uncomfortable, steel wire brush, reduce, must have, essential, smooth , UV rays, shapes.

1. There are plenty of small and _____ workbenches. 2. Welding on the ground is impractical and _____. 3. For years, welders wanted to be protected from hot sparks, _____ and hot metal. 4. Remember the _____ "measure twice, cut (or weld) once". 5. There are only a couple of _____ welding tools that you'll use regularly. 6. An auto-dimming helmet will _____ the shield only when detecting a bright light. 7. A metal file will allow you to _____the details. 8. C Clamps come in various _____ and sizes. 9. An auto-dimming helmet will _____ the risk of mistakes. 10. Protective face shield is an absolute _____ in your workshop. 11. A metal file is a great _____, because this tool is effective and cheap. 12. To finish your work, you need a _____.

ТЕМА 5. Сварочные технологии

1. Выучите слова и выражения; при необходимости проверьте транскрипцию:

1.	adjust	регулировать, приспосабливать
2.	cylinder	баллон
3.	dimension	размеры, величина
4.	edge	край, кромка
5.	filler	присадочная проволока
6.	manufacturer's specification	спецификация производителя
7.	piece	кусок, часть
8.	prepare	подготавливать, готовить
9.	proper, correct	правильный, нужный
10.	to set up	устанавливать
11.	to take precautions	приминать меры предосторожности
12.	to select	выбирать
13.	to mark	отмечать, ставить метку
14.	necessary	необходимый
15.	to cut	резать
16.	to consider	учитывать, принимать во внимание
17.	to clean	очищать
18.	important	важный
19.	to finish finishing	завершать, обрабатывать обработка, отделка
20.	according to	в соответствии с
21.	activity	деятельность
22.	to put on	надевать
23.	to feel confident	чувствовать себя уверенным
24.	safety	безопасность
25.	manual	ручной
26.	perform	исполнять, совершать
27.	advanced	продвинутый

2. Повторение. Как переводятся данные слова и выражения?

to protect one's head, to put on welding gloves, welding machine, to use welding helmet, to wear steel-toed boots, to make a weld, measuring tape, steel wire brush, ear defenders, to put on goggles, grinding machine, modern workshop, favourite tools, digital caliper, overall.

3. Прочитайте и переведите текст:

Welding Methods

There are three basic welding methods: manual, semiautomatic and automatic.

Manual welding is the oldest method, and though its proportion of the total welding market diminishes yearly, it is still the most common. Here an operator takes an electrode, clamped in a hand-held electrode holder, and manually guides the electrode along the joint as the weld is made. Usually the electrode is consumable; as the tip is consumed, the operator manually adjusts the position of the electrode to maintain a constant arc length.

Semiautomatic welding is becoming the most popular welding method. The electrode is usually a long length of small-diameter bare wire, usually in coil form, which the welding operator manually positions and advances along the weld joint. The consumable electrode is normally motor-driven at a preselected speed through the nozzle of a hand-held welding gun or torch.

Automatic welding is very similar to semiautomatic welding, except that the electrode is automatically positioned and advanced along the prescribed weld joint. Either the work may advance below the welding head or the mechanized head may move along the weld joint.

4. Согласиться или не согласиться с утверждением по тексту:

1. Manual welding is the newest method.
2. A welder can use manual position during semiautomatic welding.
3. Semiautomatic welding is the most popular welding method because the weld joint is accurate.
4. Semiautomatic welding is not the most popular welding method.
5. The welding operator manually adjusts the position of the electrode to maintain a constant arc length.

5. Определить, к какому методу сварки (manual, semiautomatic, automatic) имеет отношение следующее описание:

a. the work may advance below the welding head or the mechanized head
b. the operator manually adjusts the position of the electrode to arc length
c. the oldest method
d. the electrode is usually a long length of small-diameter bare wire
e. the consumable electrode is normally motor-driven at a preselected speed
f. the electrode is automatically positioned and advanced along the prescribed weld joint.

6. Прочитайте и переведите текст:

What is the future of welding technology?

It is important to understand the trends of your sphere if you want to be a good specialist. While most **industries** experience significant swings (for example many professions are still coming to themselves from the latest recession in economics), the **welding** field is comparatively **stable and now even** has enjoyed exciting growth. Welding is one of the careers that is in high demand at all times. Since welders are needed in almost every industry, it gives them the endless opportunities and flexibility to switch industries without changing careers.

When it comes to welding, the salaries vary a lot. It all depends on how skilled you are and how far you are willing to travel. Local jobs typically don't pay much or require a lot of skill. On the other hand, if you are willing to travel, then the salaries are almost too good. And the highest paying welding careers are the following: aerospace welding, underwater welding, military welding, pipeline welding and welding in oil and gas sector.

It is believed that the work of the welders in the future may include programming of machines and demand IT skills. For example, further space exploration will require the use of computer simulation and developing new types of welding. A number of space operations can be performed remotely, using robots and manipulators.

Robotization might change the content of the work and replace the manual welding in many situations. There are several advantages to automating a factory with welding robots such as faster work, no breaks, better weld quality. Also robotization reduce costs and save materials.

Robotic welders have proved themselves in reducing the number of accidents with workers. Now some companies started to switch gradually to robotic welding applications.

The world is changing fast. It is predicted that in the next ten years, we will be seeing more changes in technology than we've seen over the last hundred years. New exotic materials will be introduced in the, and their processing and joining will require completely new technologies. Predominant themes in welding technologies of the nearest future will be the following: robotic welding, Internet of Things (IoT), virtual reality, artificial intelligence and big data.

At the same time, topics connected with welding education and welder's health and safety will be paid a great attention. The safety of welders is naturally a key factor. New safety innovations are developed alongside the welding equipment to ensure that welders can work in hazard-free conditions. By these measures, accidents at work can be reduced and some even avoided.

7. Согласиться или не согласиться с утверждениями по тексту:

1. There is no necessity to understand the trends in your profession.
2. Now welding industry experience great swings because of the latest recession in economics.
3. Welders are always in high demand and have excellent opportunities.
4. The salary of welders is high everywhere.
5. The most perspective and well-paid job for welders is in communal enterprise.
6. Some space operations may be performed remotely using IT and robots.
7. Manual welding has a lot of advantages over robot welding.
8. Unlike robots workers makes mistakes, require breaks and salary.
9. New technologies are required for processing and joining new exotic materials.
10. Artificial intelligence, big data and virtual reality are the notions of the nearest future.
11. New equipment help in reducing accidents and making the conditions safe.
12. In the nearest future less attention will be paid to welder's safety and health.

8. Определите правильный порядок действий сварщика:

a)	Cut necessary piece of metal and clean it	f)	Visual control
b)	Switch on and adjust your welding machine	g)	Clean your working place
c)	Take a sheet of metal; select correct filler material	h)	Put on protective clothes
d)	Take precautions before using welding equipment	i)	Switch off the welding machine
e)	Mark dimensions using a measuring tape	j)	Make a weld according the task and finish edges

9. Соотнесите вопросы с ответными репликами:

1. Electric arc welding is widely used in industry.	a) No problem.
2. Peter, could you help me, please?	b) Actually, no. Why do you ask?
3. Are the workpieces of the same metal?	c) An apron, gloves, rubber boots, a helmet, a cap
4. I can't weld. Explain me.	d) Well, let's try.
5. What does special protective clothing include?	e)Oh, I see. Yes, of course

6. Shall we start welding now?	f) That's true.

10. ***Сопоставьте цифры со способом их чтения***

1. 60%	a) one third
2. 2.87	b) three and a half
3. 1/3	c) two point eight seven
4. 3 ½	d) sixty percent

11. Выполнить контрольную работу:

I. Match the words to make up the expressions:

1. to take	a) dimensions
2. to select	b) welding
3. to mark	c) protective clothes
4. to adjust	d) task
5. to put on	e) confident
6. manufacturer's	f) control
7. to feel	g) electrode
8. to cut	h) a welding machine
9. visual	i) metal
10. to finish	j) specification
11. to weld according to the	k) edges
12. manual	l) precautions

II. Translate the sentences into Russian:

1. The highest paying welding careers are aerospace welding, underwater welding, military welding, pipeline welding and welding in oil and gas sector.
2. Many space operations can be performed remotely, using robots and manipulators.
3. Our nearest future is robotic welding, Internet of Things, virtual reality, artificial intelligence and big data.
4. The processing and joining new exotic materials will require completely new technologies.
5. Your salary depends on how skilled you are and how far you are willing to travel.
6. The main advantages of robotic welding are faster work, no breaks, better quality, reduced costs, reduced accidents and saved materials.

III. Translate the sentences into English:

1. Ручная сварка требует времени, навыков и концентрации; также она опасна.
2. Не так просто выбрать нужный электрод.
3. Наденьте защитные перчатки, сварочный шлем и защитную одежду.
4. Измерьте размеры, используя измерительную ленту или цифровой штангенциркуль.
5. Роботы могут быть полезны, когда доступ к детали ограничен.
6. Роботизация может заменить человеческий труд во многих ситуациях.

VI. Put the actions in the correct order:

a)	Clean your piece of metal	h)	Make a weld according the task
b)	Adjust your welding machine	i)	Put on protective clothes
c)	Take a sheet of metal	j)	Cut necessary piece of metal
d)	Take precautions before using welding equipment	k)	Mark dimensions using a measuring tape

e)	Switch on the welding machine	l)	Select correct filler material
f)	Visual control	m)	Edge finishing
g)	Clean your working place	n)	Switch off the welding machine

IV. Fill in the gaps using the words from the box:

caliper, confident, automation, key, breaks, clothes, precautions, prepare, energy, sparks, skilled, helpful

1. The safety of welders is naturally a _____ factor. 2. I must take _____ for my safety at work. 3. The welding process has now reached the age of _____. 4. Unlike laborers, robots don't require _____ and vacations. 5. Flash, fumes, _____ and heat make manual welding a hazardous job. 6. Mark dimensions using a measuring tape or a _____. 7. Robots can be _____ when access to a part is limited or difficult to reach. 8. Put on a welding mask, protective _____ and gloves. 9. _____ a piece of metal you are going to work with. 10. Putting on protective clothes makes me feel _____. 11. Even the most _____welders make mistakes. 12. Welding robotic systems save _____.

ТЕМА 6. Традиционные виды сварки. Газосварка

1. Выучите слова и выражения; при необходимости проверьте транскрипцию:

1.	arc welding	дуговая сварка
2.	gas welding	газосварка
3.	(to) direct	прямой, направлять
4.	flame	пламя
5.	(to) overheat	перегрев(ать)
6.	to burn	гореть
7.	consumable/non-consumable	плавящийся/неплавящийся электрод
8.	spool	катушка
9.	tungsten	вольфрам
10.	variety	разнообразие, множество
11.	fuel	топливо, горючее
12.	oxyacetylene torch	ацетиленокислородная горелка
13.	semiautomatic	полуавтоматический
14.	power tool	электроинструмент
15.	precise precision	точный точность, четкость
16.	to feed the wire	подавать проволоку
17.	shielding gas	защитный газ
18.	vapor	пар
19.	impact	влиять
20.	noble gas	благородный газ
21.	blend	смешивать(ся)
22.	carbon dioxide	углекислый газ
23.	hydrogen	водород
24.	nitrogen	азот
25.	rod	прут
26.	to coat coated	покрывать покрытый

27.	flux	флюс
28.	fusible	плавкий

2. Прочитайте и переведите текст:

Gas welding

Gas welding is a non-pressure process. They use heat from a gas flame in gas welding. The flame is applied directly to the metal edges to be joined and simultaneously to a filler metal in the form of wire or rod, called the welding rod, which is melted to the joint.

Gas welding has the advantage of using equipment that is portable and does not require an electric power source. The surface to be welded and the welding wire are coated with flux, a fusible material that shields the metal from air, which would result in a defective weld.

3. Распределите следующие слова по колонкам в соответствие с частями речи:

Noun	Verb	adjective	Adverb

Equip; welding; directly; advantage; join; simultaneously; joint; advantageous; equipment; fuse; electricity; portable; require; defective requirement; electric; fusible; defect.

4.Образуйте антонимы следующих слов, используя префиксы с отрицательным значением. Полученные слова переведите:

Non-	dis-	un-	im-	ir-	in-

Possible; pressure; directly; advantage; effective; coated; regular; cover; ferrous.

5. Соотнесите слова, чтобы составить выражения:

1. Gas	a) metal
2. welding	b) process
3. non-pressure	c) weld
4. gas	d) welding
5. metal	e) power
6. filler	f) edges
7. electric	g) rod
8. power	h) material
9. fusible	i) source
10. defective	j) flame

6. Переведите следующие словосочетания:

a) на русский:

Non-pressure process; to apply directly; metals to be joined; surfaces to be welded; filler metal; welding rod; to be melted to the joint; fusible material.

b) на английский:

Газовая сварка; газовое пламя; кромки металла; одновременно; проволока или прут; портативное оборудование; источник электроэнергии; покрывать флюсом; защищать металл; приводить к; дефективный шов.

7. Вставьте правильные предлоги:

1. They use heat … a gas flame in gas welding.
2. The flame is applied directly … the metal edges.

3. Welding rod is melted … the joint.
4. The surface to be welded and the welding wire are coated … flux.
5. A fusible material shields the metal … air.
6. Air would result … a defective weld.

8. Расставьте предложения в логическом порядке в соответствии с текстом:

1. Gas welding has the advantage of using equipment that is portable and does not require an electric power source.
2. The flame is applied directly to the metal edges to be joined and simultaneously to a filler metal in the form of wire or rod, called the welding rod, which is melted to the joint.
3. Gas welding is a non-pressure process.
4. The surface to be welded and the welding wire are coated with flux, a fusible material that shields the metal from air, which would result in a defective weld.
5. They use heat from a gas flame in gas welding.

9. Соотнесите начало и конец предложений:

1. Gas welding is …	a) … directly to the metal edges.
2. They use …	b) … from air.
3. The flame is applied …	c) … of using portable equipment.
4. A filler metal is …	d) … a non-pressure process.
5. The welding rod is melted …	e) … in the form of wire or rod.
6. Gas welding has an advantage …	f) … heat from a gas flame.
7. Gas welding does not require …	g) … a defective weld.
8. Flux shields the metal …	h) … an electric power source.
9. Air can result in …	i) ... to the joint.

10. Поставьте глаголы в скобках в нужную пассивную форму:

1. The flame (to apply) directly to the metal edges and filler metal.
2. The metal edges can (to join) by gas welding.
3. A filler metal in the form of wire or rod (to call) the welding rod.
4. The welding rod (to melt) to the joint.
5. An electric power source (not to require) for gas welding.
6. The surface to be welded and the welding wire (to coat) with flux.
7. The metal (to shield) from air with flux.
8. Special fusible material for welding (to call) flux.

11. Ответьте на вопросы:

1. Is gas welding a pressure process?
2. What heat do they use in gas welding?
3. What is the flame applied directly to?
4. What is melted to the joint?
5. What advantage does gas welding have?
6. Does equipment for gas welding require an electric power source?
7. What are the surface to be welded and the welding wire coated with?
8. What is flux?
9. Why is flux necessary for a weld?

12. Выполнить контрольную работу:

Control Work

I.a) Match the words to make up the expression

b) Match the types of welding to their translation:

1.	electric power	a) torch
2.	oxyacetylene	b) source
3.	shielding	c) flux
4.	non-consumable	d) area
5.	semiautomatic	e) electrode
6.	to feed the	f) vapor
7.	carbon	g) wire
8.	to coat with	h) material
9.	water	i) gas
10.	fusible	j) dioxide
11.	defective	k) process
12.	to overheat the	l) weld

1. TIG welding	a) газосварка
2. gas welding	b) дуговая сварка
3. arc welding	c) сварка вольфрамовым электродом
4. MMA welding	d) сварка с непрерывной подачей проволоки с катушки
5. MIG welding	e) ручная сварка метал. электродом

II.

a) Match the types of welding to their definitions;
b) translate the sentences into Russian:

1. gas welding	a) uses a welding power tool and creates an electric arc between an electrode and a base material
2. MIG (GMA) welding	b) has many applications; different electrodes are used; different metals and alloys can be welded
3. MMA welding	c) wire is continuously fed from the spool; it is a semiautomatic process
4. TIG welding	d) creates a flame from a burning gas; the torch is moved by hand to control the process
5. arc welding	e) uses a non-consumable tungsten electrode and provides high quality and precision

III. Translate the expressions into English:

1. Портативное оборудование 2. Дефективный шов 3. Низкая стоимость 4. Инертный газ 5. Кромки металла 6. Создать пламя 7. Точка сварки 8. Желаемый эффект 9. Универсальный тип 10. Много применений 11. Прилагать напрямую 12. Требовать электричество 13. Одновременно 14. Защищать металл 15. Готовый продукт 16. Различные виды 17. Улучшать качество 18. Важная роль.

IV. Fill in the gaps using the words from the box:

temperatures, semi-inert, oxyacetylene, access, rod, colorless, propane, spool, defects, harmful, non-ferrous, noble

1. Inert Gases are known as _____ gases. 2. Inert Gases are _____, odorless and non-chemically reactive. 3. Gases with low reactivity are known as _____. 4. Shielding is used to protect the metal from the _____ gases in the atmosphere. 5. _____ torch produces a low heat and can be used for small things. 6. You should be careful with _____torch, it can overheat the area. 7. In MIG welding wire is continuously fed from the _____. 8. One of the great strengths of gas welding is that it can weld _____ and ferrous metals together. 9. You can use gas welding in places that do not have _____ to electricity. 10. Gas welding can't reach the _____of arc welding.
11. Choosing the wrong shielding gas can result in weld _____. 12. A filler metal may be in the form of a wire or a _____.

ТЕМА 7. Традиционные виды сварки. Дуговая сварка

1. Выучите слова и выражения; при необходимости проверьте транскрипцию:

1.	(to) supply	обеспечение, обеспечивать, снабжать
2.	direct current (DC)	постоянный ток
3.	alternating current (AC)	переменный ток
4.	to generate	производить, генерировать
5.	enough	достаточно
6.	necessary	необходимый
7.	to conduct	проводить
8.	to draw away	уводить, отодвигать
9.	tip	кончик
10.	several	несколько
11.	voltage	эл. напряжение
12.	to fluctuate	колебаться, меняться
13.	submerged arc welding	дуговая сварка под флюсом
14.	arc length	длина дуги
15.	to charge	заряжать
16.	to separate	отделять(ся)
17.	to increase/decrease	увеличивать/уменьшать
18.	contamination	загрязнение
19.	thick	толстый
20.	circuit	замыкание, цепь
21.	earth clamp	зажим заземления
22.	holder	держатель
23.	continuously	непрерывно
24.	source	источник

2. Прочитайте и переведите текст:

Arc Welding

Arc welding is the most important welding process for joining steels. It requires a *continuous supply* of *either direct or alternating* electrical *current*. This current is used *to create* an electric arc, which *generates enough* heat to melt metal and create a weld.

Arc welding has *several* advantages over other welding methods. Arc welding is faster because the concentration of heat is higher. Also, fluxes are not necessary in *certain* methods of arc welding. The most widely used arc-welding processes are ***shielded metal arc, gas-tungsten arc, gas-metal arc****, and* ***submerged arc****.*

Shielded Metal Arc Welding

For example, in shielded metal arc welding, a metallic electrode, which *conducts* electricity, is coated with flux and connected to a source of electric current. The metal to be welded is connected to the other end of the same source of current. An electric arc is formed by *touching* the *tip* of the electrode to the metal and then *drawing* it *away*. The *intense* heat of the arc melts edges of both parts to be welded and the point of the metal electrode, which *supplies filler metal* for the weld. This process is used mainly for welding steels.

3. Переведите интернациональные слова без словаря:

Process; electric; metal; method; electrode; steel; material; industry; special; technology; concentration.

4. Переведите следующие слова в соответствии с частью речи:
Metal – metallic – metallurgy; electric – electrical – electrically - electricity; weld – welding – welder; require – requirement; create – creator – creature - creation; concentrate – concentration; main – mainly.

5. Найдите переводы для следующих словосочетаний:

1. joining steels	a) несколько преимуществ
2. continuous supply	b) источник тока
3. alternating current	c) плавить кромки
4. to generate heat	d) соединение сталей
5. to create a weld	e) широко используемый
6. several advantages	f) покрывать флюсом
7. widely used	g) непрерывная подача
8. source of current	h) создавать шов
9. to coat with flux	i) переменный ток
10. to melt edges	j) производить тепло

6. Найдите в тексте английские эквиваленты для следующих выражений:
Постоянный или переменный ток; определённые методы; проводить электричество; присоединять к источнику; касаться конца электрода; дуговая сварка металлическим электродом в среде защитного газа; дуговая сварка под флюсом; дуговая сварка металлическими электродами в защитной среде; дуговая сварка вольфрамовыми электродами в среде защитного газа; подавать наплавочный металл

7. Поставьте прилагательные в скобках в нужную степень сравнения:
1. Arc welding is (fast) because the concentration of heat is (high).
2. The (widely) used arc-welding processes are shielded metal arc, gas-tungsten arc, gas-metal arc, and submerged arc.
3. Arc welding is (important) welding process for joining steels.
4. Fluxes are not (necessary) in certain methods of arc welding.

8. Выберите необходимый предлог из предложенных в скобках:
1. Arc welding is the most important welding process … joining steels. (to; for; of)
2. Arc welding has several advantages … other welding methods. (over; above; on)
3. A metallic electrode is coated … flux. (by; in; with)
4. A metallic electrode is connected to a source of electric current. (in; with; to)
5. An electric arc is formed … touching the tip of the electrode to the metal and then drawing it away. (by; with; for)
6. The intense heat … the arc melts edges of both parts to be welded. (of; in; for)

9. Поставьте глагол в скобках в Present Simple:
1. Arc welding (to be) the most important welding process for joining steels.
2. It (to require) a continuous supply of either direct or alternating electrical current.
3. Arc welding (to have) several advantages over other welding methods.
4. The metal electrode (to supply) filler metal for the weld.
5. Fluxes (not to be) necessary in certain methods of arc welding.
6. An electric arc (to generate) enough heat to melt metal and create a weld.
7. A metallic electrode (to conduct) electricity.

10. Ответьте на вопросы:
1. What is the most important welding process for joining steels?

2. What does arc welding require?
3. What is the current used for?
4. Does arc welding have any advantages over other welding methods?
5. Why is arc welding faster?
6. Are fluxes necessary in all methods of arc welding?
7. What are the most widely used arc-welding processes?
8. What is a metallic electrode coated with in shield metal arc welding?
9. What is a metallic electrode connected to?
10. Is the metal to be welded connected to the other end of the same source of current?
11. How is an electric arc formed?
12. What does the intense heat of the arc melt?
13. What does the metal electrode supply?
14. What is shielded metal arc welding mainly used for?

11. Переведите текст:

Power Supplies

To supply the electrical energy necessary for arc welding processes, a number of different power supplies can be used. The most common classification is **constant current power supplies** and **constant voltage power supplies**. In arc welding, the voltage is directly related to the length of the arc, and the current is related to the amount of heat input.

Constant current power supplies are most often used for manual welding processes such as gas tungsten arc welding and shielded metal arc welding, because they maintain a relatively constant current even as the voltage varies. This is important because in manual welding, it can be difficult to hold the electrode perfectly steady, and as a result, the arc length and thus voltage tend to fluctuate.

Constant voltage power supplies hold the voltage constant and vary the current, and as a result, are most often used for automated welding processes such as gas metal arc welding, flux cored arc welding, and submerged arc welding. In these processes, arc length is kept constant, since any fluctuation in the distance between the wire and the base material is quickly rectified by a large change in current. For example, if the wire and the base material get too close, the current will rapidly increase, which in turn causes the heat to increase and the tip of the wire to melt, returning it to its original separation distance.

The type of current used in arc welding also plays an important role in welding. Consumable electrode processes such as shielded metal arc welding and gas metal arc welding generally use direct current, but the electrode can be charged either positively or negatively. In welding, the positively charged anode will have a greater heat concentration, and as a result, changing the polarity of the electrode has an impact on weld properties. If the electrode is positively charged, it will melt more quickly, increasing weld penetration and welding speed. Alternatively, a negatively charged electrode results in more shallow welds.

Non-consumable electrode processes, such as gas tungsten arc welding, can use either type of direct current, as well as alternating current. However, with direct current, because the electrode only creates the arc and does not provide filler material, a positively charged electrode causes shallow welds, while a negatively charged electrode makes deeper welds. Alternating current rapidly moves between these two, resulting in medium-penetration welds. One disadvantage of AC, the fact that the arc must be re-ignited after every zero crossing, has been addressed with the invention of special power units that produce a square wave pattern instead of the normal sine wave, making rapid zero crossings possible and minimizing the effects of the problem.

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