

**ЗАДАНИЕ: №5,6,10,11,12,13 по теме Metals выполнить письменно в тетради, знать перевод каждого слова.**

**Ex. 1. Read and learn the Active Vocabulary:**

<b>compound</b>	смесь, соединение
<b>alloy</b>	сплав
<b>conductor</b>	проводник
<b>semiconductor</b>	полупроводник
<b>heat</b>	тепло
<b>malleable</b>	ковкий, пластичный, легко формуемый
<b>shiny</b>	блестящий
<b>property</b>	свойство
<b>cation</b> ['kætaiən]	катион (ион с положительным электрическим зарядом)
<b>loss</b>	потеря
<b>cleaving</b>	раскалывание
<b>iron</b>	железо
<b>wiring</b>	прокладка электрических проводов
<b>arrangement</b>	расположение, классификация
<b>to surround</b>	окружать
<b>side</b>	сторона
<b>to separate</b>	отделять
<b>insulator</b>	изолятор, диэлектрик
<b>luster</b>	блеск, сияние
<b>density</b>	плотность
<b>ability</b>	способность
<b>ductility</b>	ковкость, тягучесть, вязкость, пластич-
<b>capacity</b>	способность
<b>brittle</b>	ломкий, хрупкий
<b>resistant</b>	устойчивый, резистентный
<b>tool</b>	инструмент
<b>stainless</b>	коррозионно-стойкий, нержавеющей
<b>application</b>	применение
<b>cast iron</b>	чугун

**Ex. 2. Guess the meaning of the following international words:**

conductor	electricity	metal	positive
ion	electron	periodic	table
element	diagonal	line	separate
nonmetal	oxide	insulator	division
valency	chemical	physical	fact
mechanical	delocalized	gas	plastic
deformation	color	mixture	component
steel	corrosion	commercial	result
history	aerospace	automotive	bronze

**Ex. 3. Get acquainted with some chemical elements. Their meanings and pronunciation you can see in Appendix 7.**

oxygen	boron	polonium	silicon	molybdenum
aluminium	iron	zinc	copper	magnesium
nickel	palladium	platinum	gold	chromium
carbon	titanium			

**Ex. 4. Work with the dictionary. Find in the dictionary the words with the same root. Translate them.**

- Metal — metals — metallic — nonmetallic — metalliferous — metalline — metallization — metalize — metallography — metalloid — metallurgical — metallurgist — metallurgy — metalwork — metalworker;

- conduct — conductance — conduction — conductive — conductivity — conductor — semiconductor — conductress;

- electric — electrical — electrician — electricity — electrification — electrify — electro — electrocardiogram — electrochemistry — electrocute — electrocution — electrode — electrodynamics — electrokinetics — electrolier — electrolyze — electrolysis — electrolyte — electromagnet — electromagnetic — electromechanical — electrometallurgy — electrometer — electromotive — electromotor — electron — electronegative — electronic — electronics — electrophone — electroplate — electroplating — electropositive — electroscope — electrostatics — electrotherapy — electrotype;

- arrange — arrangement — arranger;

- divide — subdivide — divided — dividend — divider — dividing — dividable — divisibility — divisible — division — divisional — divisive — divisor;

- apply — appliance — applicable — applicant — application — applied — appliqué;

- form — formal — formaldehyde — formalin — formalism — formalist — formality — formalize — format — formate — formation — formative — former — formless — formula — formulate — formulation — formulism — deformation;

- oxide — oxidate — oxidize — oxidation — oxidization — oxygen — oxygenate — oxygenize — oxygenous;

- able — ably — ability — unable;

- origin — original — originality — originally — originate — origination — originative — originator;

- product — produce — producer — producible — production — productive — productivity.

**Ex. 5. Find pairs of synonyms:**

- |                 |                         |
|-----------------|-------------------------|
| 1) to deal with | a) shine                |
| 2) ductile      | b) feature              |
| 3) application  | c) to be concerned with |
| 4) ability      | d) organization         |
| 5) property     | e) malleable            |
| 6) to solve     | f) usage                |
| 7) tool         | g) to decide            |
| 8) arrangement  | h) capacity             |
| 9) luster       | i) instrument           |

Ex. 6. Read the text.

Metal

1. **Definition of a metal.** A metal is an element, compound, or alloy that is a good conductor of both electricity and heat. Metals are usually malleable and shiny.

Metals are sometimes described as an arrangement of positive ions surrounded by a sea of delocalized electrons. Metals occupy the bulk of the periodic table, while non-metallic elements can only be found on its right-hand side. A diagonal line, drawn from boron (B) to polonium (Po), separates the metals from the non-metals. Most elements on this line are metalloids, sometimes called semiconductors. This is because these elements exhibit electrical properties common to both conductors and insulators. Elements to the lower left of this division line are called metals, while elements to the upper right of the division line are called nonmetals, as shown on the figure 1.

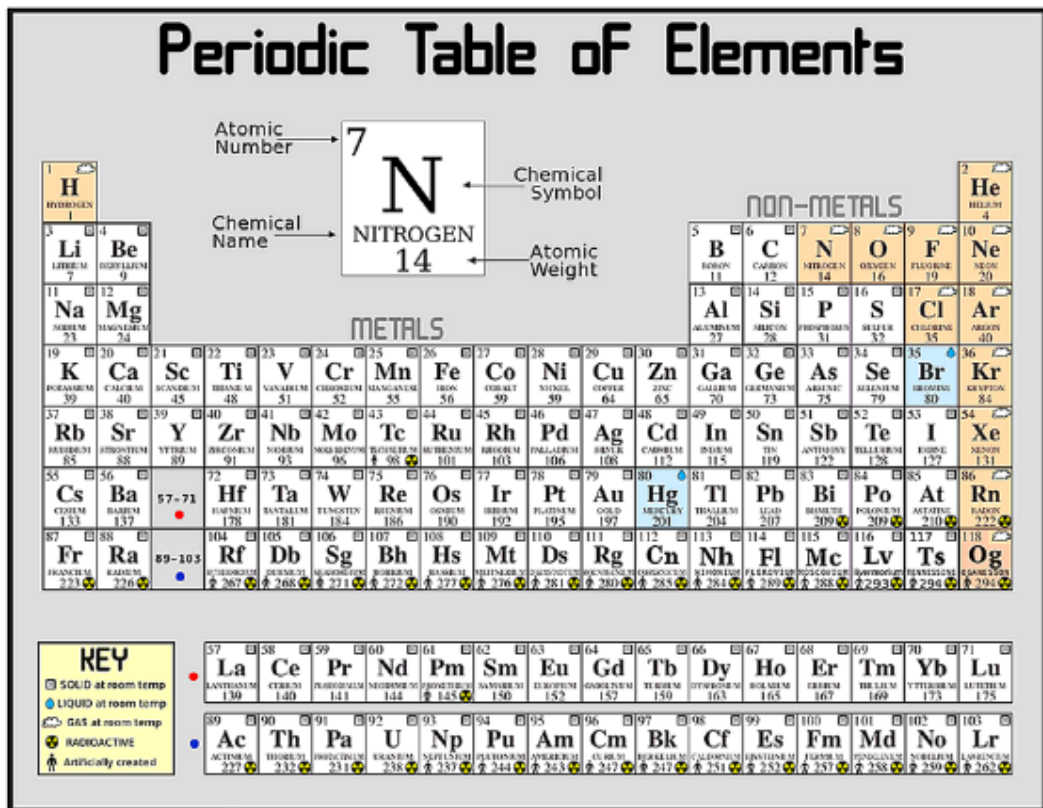


Fig. 1. Periodic Table of Elements<sup>1</sup>

**2. Properties of a metal.** Metals have different properties, such as: chemical, physical, electrical and mechanical.

**Chemical properties.** Metals form cations through electron loss, reacting with oxygen in the air to form oxides. The oxides of metals are generally basic, and nonmetals are acidic.

**Physical properties** of metals mean that they have high electrical conductivity which depends on their valency of ions, thermal conductivity, luster and density, and the ability to be deformed under stress without cleaving.

**Electrical properties** of metal are concerned with the electrical and thermal conductivity of metals that originate from the fact that in the metallic bond, the outer electrons of the metal atoms form a gas of nearly free electrons.

**Mechanical properties.** Mechanical properties of metals include ductility, which occurs due to their capacity for plastic deformation.

**3. Alloys.** An alloy is a mixture of two or more elements in solid solution in which the major component is a metal. The aim of mak-

ing alloys is generally to make metals less brittle, harder, resistant to corrosion, or have a more desirable color and luster. Of all the metallic alloys in use today, the alloys of iron (steel, stainless steel, cast iron, tool steel, alloy steel) make up the largest proportion both by quantity and commercial value. The addition of silicon will produce cast irons, while the addition of chromium, nickel and molybdenum to carbon steels (more than 10 %) results in stainless steels.

Other significant metallic alloys are those of aluminium, titanium, copper and magnesium. Copper alloys have been known since prehistory — bronze gave the Bronze Age its name — and have many applications today, most importantly in electrical wiring. The alloys of aluminium, titanium and magnesium are valued for aerospace and some automotive applications.

**Ex. 10. Find English equivalents to the Russian ones.**

- |   |                                 |
|---|---------------------------------|
| • хороший проводник электричества и тепла _____ | • иметь отношение _____         |
| • ковкий и блестящий _____                      | • происходить _____             |
| • классификация положительных ионов _____       | • металлическая связь _____     |
| • делокализованный электрон _____               | • внешний электрон _____        |
| • периодическая таблица _____                   | • свободный электрон _____      |
| • занимать _____                                | • включать _____                |
| • правая сторона _____                          | • ковкость _____                |
| • диагональная строка _____                     | • происходить _____             |
| • разделять _____                               | • вследствие _____              |
| • проводники и диэлектрики _____                | • пластическая деформация _____ |
| • проявлять _____                               | • твердый раствор _____         |

- |  |  |
|--|--|
| • химические свойства _____            | • менее хрупкий _____                      |
| • катион _____                         | • устойчивый к коррозии _____              |
| • потеря электронов _____              | • нержавеющая сталь _____                  |
| • взаимодействующий с кислородом _____ | • чугун _____                              |
| • кислотный _____                      | • инструментальная сталь _____             |
| • электропроводимость _____            | • легированная сталь _____                 |
| • валентность ионов _____              | • количество и коммерческая ценность _____ |
| • теплопроводность _____               | • добавление _____                         |
| • блеск и плотность _____              | • являться результатом _____               |
| • способность деформироваться _____    | • значимость _____                         |
| • напряжение _____                     | • бронзовый век _____                      |
| • не раскаляясь _____                  | • электропроводка _____                    |
|  | • иметь ценность _____                     |

**Ex. 11. Fill in gaps with the words and word-combinations in the box:**

periodic table / conductor / properties / alloy / cations / conductivity / copper / ductility

1. A metal is an element, compound or alloy that is a good \_\_\_\_\_ of both electricity and heat.
2. Metals are called an arrangement of \_\_\_\_\_.
3. Metals occupy the main part of the \_\_\_\_\_.
4. Metals have chemical, physical, electrical and mechanical \_\_\_\_\_.
5. Metals have electrical and thermal \_\_\_\_\_.
6. \_\_\_\_\_ occurs due to metal capacity for plastic deformation.
7. A mixture of several elements with a metal is called an \_\_\_\_\_.
8. The alloys of \_\_\_\_\_ is applied in electrical wiring.

**Ex. 12. Complete the sentences using the information from the text.**

1. Non-metallic elements are situated in the right part of the \_\_\_\_\_.
2. High electrical conductivity depends on the \_\_\_\_\_.
3. The outer electrons of the metal atoms form a gas of \_\_\_\_\_.
4. The aim of making alloys is generally to make metals \_\_\_\_\_.
5. The alloys of iron make up the main proportion by \_\_\_\_\_.
6. The alloys of aluminium, titanium and magnesium are valued for \_\_\_\_\_.

**Ex. 13. Answer the questions to the text.**

1. What is a metal?
2. What form are metals occupied in?
3. What properties of a metal do you know?
4. What is chemical property of a metal?
5. What is physical property of a metal?
6. What is electrical property of a metal?
7. What is mechanical property of a metal?
8. What is an alloy?
9. What is the aim of making alloys?
10. What production is the addition of silicon applied in?
11. Chromium, nickel and molybdenum are added to produce stainless steel, aren't they?
12. What alloys are used in aerospace industry?