MECHANICAL AND CHEMICAL PROPERTIES OF CARBON STEEL

6.1. Vocabulary

Ex. 1. *Match the words with their Russian equivalents.*

1. add	a. разрез
2. cut	b. панели кузова
3. wear resistance	c. способность принимать нужную форму
4. punch	d. хрупкий
5. forging	e. марганец
6. ductility	f. ковка
7. manganese 	g. мягкий
8. wire	h. углерод
9. axle	i. добавлять
10. contain	j. простой
11. body panels	k. компостер
12. malleability	l. износостойкость
13. heat	m. плохой
14. plain	n. провод
15. brittle	o. содержать
16. spring	p. пружина
17. poor	q. обрабатываемость
18. machinability	r. вал
19. mild	s. способность металла изменять форму
20. carbon 	t. нагревание

Ex. 2. *Complete the sentences with the given words.*

plain, heat control, punch, Forging, Ductility, axle, add, Wear resistance, Machinability, wire, contain, Malleability, brittle, Poor

Don't forget to _____(1) the flux before welding the pieces together.

The _____(2) of the cart broke, so we had to replace it.

Be careful with that piece, it's very _____(3) and can break easily.

_____(4) affects how easily metal can be shaped during welding.

Use _____(5) welding rods for straightforward projects.

_____(6) welding techniques can result in weak joints.

The _____(7) tool is essential for creating holes in metal plates.

_____(8) is a key factor in choosing welding materials.

The _____(9) feeder ensures a steady supply of welding wire for the project.

This metal container will _____(10) all the welding supplies.

_____(11) is important when shaping metal through welding.

_____(12) is a common technique to shape metals using heat.

Proper _____(13) is crucial when welding different metals.

_____(14) determines how easily a material can be welded.

6.2. Word Formation

Ex. 1. *Change the form of the words to complete the sentences.*

1. The house was left _____ (painted) after the workers went on strike.

2. She saw the _____ (advantage) of the new policy almost immediately.

3. His _____ (like) for broccoli was well known in the family.

4. The software was _____ (compatible) with the new operating system, causing many issues.

5. The judge declared the document _____ (valid) due to several errors.

6. They found an _____ (expensive) alternative that worked just as well.

7. It was _____ (fortunate) that they missed the last train home.

6.3. Reading

Ex. 1. *Read the text.*

Carbon steel is a versatile material widely used in many industries. It is composed primarily of iron and carbon, with the carbon content typically ranging from 0.2% to 2.1% by weight. The exact properties of carbon steel depend on the amount of carbon and the way it is processed.

One of the key mechanical properties of carbon steel is its strength. Higher carbon content usually means higher strength, making it ideal for structural applications. However, as the carbon content increases, the steel can become more brittle and less ductile, which means it can break more easily without bending.

Carbon steel is also known for its hardness. This property makes it suitable for tools and machinery that require a hard, wear-resistant material. The hardness can be increased through processes like quenching and tempering.

In terms of chemical properties, carbon steel is prone to rust when exposed to moisture and air, which is a downside. To prevent corrosion, it is often coated with paint or another protective layer. The steel's reactivity with other elements is relatively low, but it can still combine with sulfur and phosphorus, which can affect its overall performance.

In summary, carbon steel offers a balance of strength, hardness, and affordability, making it a popular choice for a wide range of applications. However, its susceptibility to rust and brittleness at higher carbon content should be considered when selecting it for specific uses.

Ex. 2. *Answer the questions.*

1. What is the composition of carbon steel?

2. How does the strength of carbon steel vary with different carbon content levels?

3. Why is carbon steel suitable for structural applications?

4. How can the hardness of carbon steel be increased?

5. What chemical property of carbon steel makes it prone to rust?

6. How can corrosion of carbon steel be prevented?

7. What are some factors to consider when selecting carbon steel for specific uses?

6.4. Communication

Ex. 1. *Make sentences using the following words:*

1. Carbon/steel/known
2. Commonly/used/construction
3. Hardness/can/vary
4. Tools/machinery/made
5. Engineers/choose/reliability
6. Welding/carbon/techniques
7. Rust/properly/maintained
8. Heat/treatment/enhance
9. Understanding/properties/important
10. Versatile/material/applications