

**Методичні вказівки
з “Іноземної мови за професійним
спрямуванням” (англійська)
для підготовки студентів старших курсів
до вступу у магістратуру**

Міністерство освіти і науки України
Вінницький національний технічний університет

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Методичні вказівки з «Іноземної мови за професійним спрямуванням» (англійська) для підготовки студентів старших курсів до вступу у магістратуру / Уклад. : О. В. Шестопад, В. О. Сенченко, А. А. Слободянюк, Н. А. Насонова – Вінниця : ВНТУ, 2016. – 79 с.

Дані методичні вказівки призначені для підготовки студентів старших курсів до вступу у магістратуру зі спеціальностей «Менеджмент» та «Зварювання», складаються з трьох розділів, містять навчальний матеріал, що відповідає програмі курсу англійської мови, що вивчається у технічних ВНЗ. Завданням є забезпечення знань, необхідних фахівцям для роботи у галузях менеджменту і зварювання, та підготовка до складання іспиту з англійської мови у магістратуру.

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PART 1
UNIT 1
PROFESSION OF AN ECONOMIST

Speaking

1. Why have you chosen the profession of an economist?
2. What skills are important in an economist's job?
3. What are your plans for the future (to work for somebody or operate your own business)?
4. Do you think you have entrepreneurial flair or talent? What traits is a successful businessman supposed to possess?
5. What do economists study?

Text 1

As you read the text "Profession Of an Economist", focus on different types of economists and their activities

How to Become an Economist

An economist is a financial researcher, analyst, and also forecaster. With a keen understanding of financial markets, they gather information, look for trends, and predict what will happen in the future when it comes to resources, money, and finance.

Economists have great skills in logic, as well as mathematics. They are problems solvers, have a keen attention to details, and are apt in academics. They are concerned with the production, distribution, and consumption of goods and services and are interested in helping society get as much satisfaction as possible from its limited resources. If you enjoy working with research, statistics, financial markets then you might consider a career as an economist. Business firms, banks, insurance companies, labor unions, governmental agencies, and others seek advice from economists to use in their decision making.

Education Requirements to Become an Economist

To become an economist, you'll need to have a four year Bachelor Degree with a focus on business and economics. Take subjects like business, marketing, finance, accounting and economics. Having an understanding of politics and industry can also be helpful, as these sectors are closely linked with the economy, both locally and globally. In the USA, for example, most successful economist have an MBA or PhD in economics, or a similar field within business. The pathway many people take is first to complete their four year undergraduate degree, and find a job somewhere within business. While they are gaining experience and earning money, they take on postgraduate study part

time. Even if you are making coffee in a strong company, you are still learning as well as meeting people in the industry. Networking is going to be an important part of your career, and it's never too early to start.

Economists are employed in a number of different job settings. About half of them are *academic economists*, who engage in teaching, writing and doing research in colleges and Universities. They also write textbooks and articles, develop and test new theoretical models, provide consulting services to governments and businesses, and engage in variety of other professional activities. In order to teach at a four-year college, it is essential to have a PhD in economics. Many academic economists also have the opportunity to consult either for business or government.

Government economists work for federal, state, and local governments in a wide variety of positions involving analysis and policy making. For example, to get this position in Canada an applicant must have the following qualifications: successful completion of a Masters Degree in Economics, Business Administration, Mathematics, or a related discipline or approved equivalent combination of education and experience. Minimum one year experience in a large multi-divisional organization including experience in forecasting, research, analysis, budgets, project management.

Business economist focuses on the decisions made by corporations and consumers related to supply and demand. At the root of business economics is microeconomic theory. Microeconomics investigates the various factors that influence the behavior of individuals and firms. *Business economists* work for banks, insurance companies, investment companies, manufacturing firms, economic research firms, and management consulting firms. Business economists help corporations decide how much of a good to produce. The goal here is to maximize profit at all times. Producing too much of a good can lead to a surplus in the marketplace, resulting in lower prices and thus lower profits over time. Not producing enough can leave a corporation out of a growing marketplace, and reduce profit potential. Learning as much as you can about areas other than finance is also important to become an economist.

Some economists operate their own economic businesses. They are called *entrepreneurs*. *Entrepreneur* is an owner or manager of a business enterprise who makes money through risk and initiative. The term was originally a loanword from French and was first defined by the Irish-French economist Richard Cantillon. An individual hoping to start up a new company needs to have entrepreneurial flair or talent, strong communication skills as an economist, especially written, knowledge of state, federal, and international law can also be of help. Management skill and strong team building abilities are essential leadership attributes for successful entrepreneurs. Leadership and management ability are essential qualities of an entrepreneur. Entrepreneurship is regarded to be the first track to success. Rather than to take a low-wage, big-industry job, people opt to use their wits and energy to climb the ladder of independence.

Entrepreneurs build for-profit and nonprofit ventures. The most well-known type of entrepreneurial venture is the for-profit, or commercial, venture, which sells products or services for a profit.

Entrepreneurs can also launch a nonprofit venture whose purpose is to fulfill a social mission rather than to make money. Entrepreneurial ventures can grow large or stay small, and they can operate at any level: local, national or international.

Vocabulary

Read and memorize the following words, word-combinations and word-groups

Forecaster is someone who uses detailed knowledge about a particular activity in order to work out what they think will happen in that activity in the future. E.g. *Some of the nation's top economic forecasters say the economic recovery is picking up speed.*

Research is work that involves studying something and trying to discover facts about it. E.g. *65 percent of the 1987 budget went for nuclear weapons research and production.*

Predict say or estimate that (a specified thing) will happen in the future or will be a consequence of something. E.g. *It is too early to predict a result.*

To be apt in/at (academics) appropriate or suitable in the circumstances. E.g. *Generally, most gifted children are apt at thinking, reading, understanding and retrieving what they have learned.*

Requirement is a quality or qualification that you must have in order to be allowed to do something or to be suitable for something. E.g. *The products met all legal requirements.*

Discussion

Answer the following questions

1. What are the most important skills for an economist?
2. What subjects do they learn at University?
3. How much education does it take to become an academic economist?
4. What do government and academic economists focus on?
5. What are the spheres of activities of:
 - a) business economist ?
 - b) entrepreneurs ?

Vocabulary practice

Ex. 1 Give English equivalents of the following

розвиток

заробити (отримувати гроші, прибуток)

досвід, кваліфікація

прибуток

вигода (користь)

ВИГОТОВЛЯТИ

надлишок
підприємництво, підприємницька діяльність
міжнародне право

Ex. 2 Give Ukrainian equivalents of the following research

to have the opportunity
important skills
requirement
to launch a nonprofit venture
to climb the ladder of independence
budget

Ex. 3 Choose the qualities and skills which are suitable for each position

<i>Academic economists</i>	<i>Government economists</i>	<i>Business economists</i>	<i>Entrepreneurs</i>

- it is essential to have a PhD in economics;
- do research, write papers and books, and give lectures, contributing their knowledge to the advancement of the discipline;
- perform such tasks as forecasting the business environment, interpreting the impact of public/governmental policy on the firm, collecting and processing data;
- focus on the decisions made by corporations and consumers related to supply and demand;
- positions involving analysis and policy making;
- makes money through risk and initiative;
- management skill and strong team building abilities;
- formulate policy in such areas as agriculture, forestry, business, finance, labor, transportation, urban economics, or international trade and development.

Ex. 4 From the following list, use each word only once to complete the sentences below

- a) accurately
- b) independently
- c) systematic
- d) persistence
- e) communication
- f) leadership
- g) analyze

h) decisions

i) process

Helpful qualities for an economist include the following:

1. The ability to work _____ with details.
2. The ability to work well _____ as well as with others.
3. The ability to be objective and _____ in one's work.
4. Patience and _____ (since economists and marketing research analysts must spend long hours on independent study and problem solving).
5. Effective _____ skills.
6. Intellectual curiosity and _____ ability.
7. The ability to collect, organize, interpret, and _____ data.
8. The ability to make _____ based on experience and using data.
9. Enjoyment of the research _____.

Ex. 5 Match the following words in column A with their definitions in column B

A	B
<i>A forecaster</i>	a) is a project or activity which is new, exciting, and difficult because it involves the risk of failure
<i>An earner</i>	b) a special or instinctive aptitude or ability for doing something well
<i>Experience</i>	c) a financial gain, esp. the difference between the amount earned and the amount spent in buying, operating, or producing something
<i>A profit</i>	d) is knowledge or skill in a particular job or activity, which you have gained because you have done that job or activity for a long time
<i>A flair for (languages, economics)</i>	e) is someone or something that earns money or produces profit
<i>Venture</i>	f) is someone who uses detailed knowledge about a particular activity in order to work out what they think will happen in that activity in the future.

Text 2

Ex. 1 Read and translate the text “The Importance Of Small Businesses To Economy”

A small business is one that is independently owned and operated, and not dominant in its field. For example, in Canada a service or retail business is considered “small” if the annual sales are \$3.5 million or less. The definition of a small business is a firm with fewer than 50 employees, while a medium sized

business has from 50 to 500 staff, and a large business employs more than 500 persons. A manufacturing business is small if it employs less than 500 people. Most businesses are small. In fact, 99 percent of all businesses in Canada are considered small. Although big businesses are better known and have an obvious effect on the economy, small businesses are the foundation of the economy and the cause of economic change. Half of the workforce is employed by small businesses. Most new ideas, goods, and service innovation come from new small ventures. Nearly two out of every three new jobs are created by small businesses.

Good entrepreneurs use the overall economic environment as an indicator to determine when it is a good time to start a new business. Successful entrepreneurs start in small shops and develop or expand into large corporations. Products are modified and improved over time.

Ex. 2 Read the following sentences and write T for true statements and F for false statements

1. A small business is operated and owned independently.
2. A company that makes more than \$3.5 million is considered a small business.
3. Most businesses in Canada are considered small.
4. Small businesses are the basis of the economy.
5. Large businesses are more responsible for economic change in Canada.
6. Most new jobs are created by small businesses.
7. The best time to start a small business is in a favorable economic environment.
8. Successful businesses change and improve their products as they get larger.

Discussion

Answer the following questions

1. What are two ways in which small businesses benefit the economy?
2. What is the definition of a small business?
3. Name a big business and a small business in our country.

UNIT 2 FAMOUS ECONOMISTS AND THEORIES

Speaking

1. What do you think an economist is? What do economists study?
2. Do you agree that economics is helpful in everyday life? Give your arguments.
3. Try to think of several important decisions that you have made recently. What was the opportunity cost of each decision?
4. Do you think economics is a theoretical or applied discipline?
5. Imagine a world without a problem of scarcity. Would you enjoy living in such a world?

Text 3

As you read the text “Famous Economists and Theories”, focus on the theories of famous economists.

Economics is a very new science; you know, for example, that the ancient Greeks studied Philosophy, Medicine, Mathematics but not Economics.

Economists are scholars who specialize in economics. They study the concepts of economics and devise methods to both measure and fuel economic prosperity. Various economists have presented theories and created models to explain the functioning of the economy as a whole, as a result of which they have changed the world for all of us – whether we know it or not.

Classical economists

Adam Smith was born in Kirkcaldy located to the north of Edinburgh in the year 1723. Adam Smith was to become the first political economist the world had ever known. He was to take his place at the head of the first school, one that continues and is known as the “classical school”. In 1751, at age twenty-eight, Adam Smith became a professor of Logic at Glasgow. It was his first academic appointment. Smith was a curious human being. Smith led a quiet and sheltered life; he lived with his mother (she lived to be ninety) and remained a bachelor all his life. Adam Smith acquired a great reputation as a lecturer. Some time later he became a tutor to a wealthy Scottish duke. Then he received a grant of 300 pounds a year. It was a very big sum, 10 times the average income at that time. With the financial security of his grant, Smith devoted 10 years to writing his work which founded economic science. Its full name was “An Inquiry into the

Nature and Causes of the Wealth of Nations”. It was published with great success in 1776.

The Wealth of Nations opens with a description of the specialization of labor in the manufacture of pins; the book covers a variety of subjects: from the professorships at Oxford to the statistics; from stamp duties to the coined money used by the Romans.

What Adam Smith did in his book was to explain how self-interest was the engine of the economy and competition its governor. He set forth the great lesson that all economists come to sooner or later. Robert Heilbroner wrote: “...he has found in the mechanism of the market a self regulating system which provides for society's orderly provision.”

According to him, there was a “natural order”, the market, an “invisible hand”, which made everything work. Every single person, selfish himself, only searching for his own interest, gets at the end social welfare. He also describes the circular flow of money. He established the principle of the advantages of foreign trade. Over two hundred years later, however, Smith is most remembered and revered for creating the economic framework for modern capitalism.

Thomas Malthus (1776–1834, English) said that the increase in the world population would lead to wages level drop and workers to starvation. Malthus became widely known for his theories about change in population. His “An Essay on the Principle of Population” observed that sooner or later population will be checked by famine and disease, leading to what is known as a Malthusian catastrophe.

Neoclassical economists and Microeconomics

Carl Menger (1841–1921, Austrian), Leon Walras (1834–1910, Swiss) and Alfred Marshall (1842–1924, English) settled down modern Microeconomics. *Alfred Marshall* is one of the great names in the development of contemporary economic thought, and the book by which he is most widely known – Principles of Economics – is one of the high points in the literature of social science. His influence was enormous; so that the first 25 years of twentieth-century economics may be described as the “age of Marshall”. Marshall develops the concept of wages determined by demand and supply, marginal utility, and costs of production. He is known as one of the founders of economics.

Macroeconomics: Keynes and Friedman

John Maynard Keynes (1883–1946, English), father of modern Macroeconomics, was the first economist who said that not everything depended on the market; he said that, unlike Adam Smith, the market by itself in situations of economic crisis cannot solve the economic unbalance, the unemployment in the labor market; so the Government has to help it spending money, mainly in infrastructures. *Milton Friedman* (1912–2013, American), father of the *School of Chicago*; he settled the concepts of “Quantity theory of money”. Some of his prominent contributions to this field include the concept of Monetarism, Price

Theory, Applied Macroeconomics, Friedman Test, etc. He won the Nobel Prize in 1976 for his theory of monetarism. One very famous sentence he said is “There is no such thing as a free lunch”: nothing is for free, one way or the other, you have to pay for it. He was a well-known American economist and professor of statistics at the University of Chicago. He has made his mark among other economists and scholars and is best known for his theoretical and empirical research work in consumption analysis, monetary history and theory for demonstrating the complexity of stabilization policy. He acted as an economic advisor to the U.S. President Ronald Reagan. He then founded The Friedman Foundation for Educational Choice. The Economist called him the most influential economist of the second half of the 20th century.

Their works didn’t just help the economy of their respective countries, but was quite beneficial for the world economy as well. If it were not for these economists, several key concepts of the subject would have been a lot more difficult for us to understand or explain.

Ex. 1 Try to guess an economist

Contribution to Economics	Economist
1. His book “The Wealth of Nations” showed the power of the “invisible hand” of the market.	A. Alfred Marshall
2. He develops the concept of wages determined by demand and supply, marginal utility, and costs of production.	B. Adam Smith
3. His Essay on the Principle of Population predicted that population growth would drive living standards toward the subsistence level.	C. Keynes
4. The market by itself in situations of economic crisis cannot solve the economic unbalance	D. Thomas Malthus
5. He settled the concepts of “Quantity theory of money”. He acted as an economic advisor to the U.S. President.	E. Milton Friedman

Ex. 2 Study the biographical data of David Ricardo and Thomas Malthus, write down as in the example

Date of Birth (DOB)

Place of Birth (POB)

Education

Scientific Activity

Works

Impact on Economics

Text 4

Ex. 3 Translate the text “Woman’s Place in Management” into Ukrainian

Bad news for female managers. A study of gender and discipline at work, by Leanne Atwater, a professor at the school of Management at Arizona State University, and two colleagues, finds that women dislike being told off by another woman even more than men do.

Many studies of male and female have claimed that the sexes differ in their styles of leadership: women do better at the people’s side, men at the getting-the-job-done side.

Sociologists have studied the different reactions of girls and boys to discipline at school: boys get used to being reprimanded whereas girls, who are more rarely rebuked, take it more personally. But nobody seems to have studied discipline and gender at work.

Ms Atwater and her colleagues interviewed 163 workers from a broad range of jobs who had been disciplined in a variety of ways, from being fired to being ticked off. In about 40% of cases, they found, subordinates changed their behavior as a result of their telling off, and female bosses were as successful in this as men. But male bosses were much more severe than women: they were three times as likely to suspend or sack a subordinate, and only half as likely to give merely an oral wiggling. Even so, when female subordinates were asked if they felt responsible for their bad behavior, 52% said no when a female boss read the riot act but only 18% when the boss was male.

One explanation for such differences, suggested by a member of the audience at the Academy of Management conference in Toronto where the paper was recently presented, is that women tend to resolve conflicts quickly and are therefore blamed for overreacting – while men wait in the hope that things will blow over. Another explanation, from Alice Eagly, a professor of psychology at North-western University, is that women are recent arrivals in managerial roles, and so have less legitimacy than men.

Ex. 4 Role-play

A: Imagine that you are Chief Executive Officer of a famous corporation.

A journalist will interview you about your career. Answer his/her questions.

B: You are a journalist. Introduce yourself to Chief Executive Officer and interview him about his career

Questions examples:

Could I ask you some questions about your business?

When did you start your business? Are you only a service provider?

Do you have international presence?

Do you think recession is affecting your business?

What is the strength of your employees?

What is so special about your business? How do you motivate your employees?

Do you take of everything personally?

Do you have any program like employee of the month or employee of the year?

How many branches do you have in overseas?

What one quality in your people really affect your business?

How often do you travel abroad? Do you really believe in innovation?

Do you think every company should prepare budget for income and expenses?

Do you think technology is must to grow your business?

Do you invite outside consultants to train your people?

What do you feel about growth of your company?

Do you want to give any message to the people?

What one thing can transform business to a higher level?

UNIT 3 ECONOMICS AS A SCIENCE

Speaking

1. Do you know what scarcity is? Do you agree that scarcity is typical for all nations?
2. What is a luxury and what is a necessity?
3. What is economics?
4. Are you interested in economics? How important is economics?
5. Do you think economics is a good subject to study?
6. How is the economy in your country?
7. What are the biggest economic problems in your country?
8. What was the last thing you read or heard about economics?
9. Do you think economics is the most important thing people think about in an election?
10. Do you read or watch economics news in newspapers and on the TV?
11. Do you worry about the world economy?
12. What are the biggest economic problems in the world?

Text 5

As you read the text “Economics As a Science”, focus on the difference between macroeconomics and microeconomics

Economics: the Study of Scarcity and Choice

Our world is a finite place where people, both individually and collectively, face the problem of scarcity. Scarcity is the condition in which human wants are forever greater than the available supply of time, goods and resources.

Because of scarcity, it is impossible to satisfy every desire. Perhaps you would like a big home, clean air, better health care, shelter for the homeless, more leisure time, and so on. Unfortunately, nature does not offer the Garden of Eden, where every desire is fulfilled. Instead, there are always limits on the economy's ability to satisfy unlimited wants.

You may think your scarcity problem would disappear if you were rich, but wealth does not solve the problem. No matter how affluent an individual is, the wish list continues to grow. The condition of scarcity means all individuals,

whether rich or poor, are dissatisfied with their material well-being and would like more. What is true for individuals also applies to society.

Economics is the study of how society chooses to allocate its scarce resources to the production of goods and services in order to satisfy unlimited wants. Society makes two kinds of choices: economy-wide, or macro-choices and individual, or micro-choices. The prefixes “macro” and “micro” come from the Greek words meaning “large” and “small”, respectively.

Reflecting the “macro” and “micro” perspectives, economics consists of two main branches: macroeconomics and microeconomics.

Macroeconomics

Macroeconomics is the branch of economics that studies decision making for the economy as a whole. Macroeconomics examines economy-wide variables, such as inflation, unemployment, growth of the economy, money supply and national incomes.

Microeconomics

Microeconomics is the branch of economics that studies decision making by a single individual, household, firm, industry or level of government. Microeconomics applies a microscope to specific parts of an economy, as one would examine cells in the body. The focus is on small economic units, such as economic decisions of particular groups of consumers and businesses.

Vocabulary

Easily confused words: economic / economics / economy / economical / economist / economize. Study the explanations of the words

Economic means concerned with the organization of the money, industry, and trade of a country, region or social group.

Something that is *economical* does not require a lot of money to operate. If someone is *economical*, they spend money carefully and sensibly. *Economical* also means using the minimum amount of something that is necessary.

Ex. 1 Expand the sentences, using the text

1. Our world is a finite place where people..... .
2. Scarcity is the condition in which..... .
3. Economics is the study of how..... .
4. Macroeconomics is the branch of economics that..... .
5. Microeconomics is..... .

Ex. 2 Read and memorize the definitions

Factors of production which are also called productive resources, are the basic resources needed for the production of economic goods and services. Economists, traditionally, have divided the factors of production into three basic categories: (1) natural resources; (2) capital goods; (3) labor. In addition, many economists add the fourth factor of production – entrepreneurship to the list.

Natural resources are things provided by nature. Land, air, water, forests, coal, iron ore, oil and other minerals are examples of natural resources. They are the starting points of all production, and they represent the most basic limitations of the productive capacity of an economy.

Capital goods are human-made resources that are used for the production of other goods and services. Factories, machines, tools, railroads, trucks and business buildings are all examples of capital goods.

Labor is essential to production, since natural resources and capital goods are of no value unless they can be put to use.

Entrepreneurship may be defined as the function of combining and organizing natural resources, capital goods, and labor assuming the risks of business failure, and providing the creativity and managerial skills necessary for production to take place.

An entrepreneur is a person who carries out these tasks in the hope of making financial gains.

UNIT 4

ENGLISH AS THE GLOBAL LANGUAGE

Speaking

1. Why do you study English?
2. How much of a barrier do you think language is?
3. Do you think that one day there will be just one language in the world?
Would the world be a better place?
4. Does language make the personalities of each nationality different?
5. Do you think body language is universal?
6. Would you like to learn sign language?
7. What languages do you like or dislike the sound of?
8. What are your feelings towards your own language?
9. How would you compare your own language with English?
10. Why do you think there are so many different languages in the world?
11. What do you think of languages that are dying? Do you think they should be preserved?
12. What three languages would you really like to speak, and why?
13. What is the most confusing language in the world?

Text 6

Read and retell the text “English As the Global Language”

English has become the global language of trade and commerce in the past few decades, affecting many key aspects of business in the modern world. The English language first spread as the result of colonial expansion, and has become the standard for all important official communications in many countries. In the modern world, thanks to the Internet, English continues to spread as the major medium through which both small businesses and large corporations do business.

English is the main language for all business transacted by the Commonwealth, which promotes free trade amongst its member states. English is a global language for doing business. In some industries, such as the airline

and shipping industries, English is the official standard language. In addition, English is a major language for finance and the stock markets around the world. People wishing to do business globally need to have a good command of spoken English. The ability to clearly write in English is also key, as many forms of business communication, from e-mails to important business contracts, are written in English. In some industries, a knowledge of business terminology in English is the success of a business. Examples of specialized businesses requiring a knowledge of English include computing, engineering, science, technology, medicine and law. English is one of the major languages for doing business on the Internet. A website written in English can attract many customers and small business owners can sell items to people around the world. To know English today is absolutely necessary for future economists and for every good specialist.

Discussion

Answer the questions

1. What images are in your mind when you hear the word “English”?
2. Why are you studying English?
3. What adjectives describe your feelings about English?
4. How much time have you spent on English?
5. How happy are you with your English level?
6. Has English improved your life?
7. What are the things you like most and least about English?
8. Do you think English is more or less difficult than your language?
9. What is your favorite word in English, and why?

UNIT 5 TRADE AND MONEY

Speaking

1. Some people say that “money makes the world go around”. Do you agree? Why or why not?
2. What would life be like without money?
3. How often do you think about money?
4. What does the expression “money doesn’t grow on trees” mean? What would life be like if it did?
5. How would the world be different if all the money in the world was shared out equally among all people?
6. What’s the best way of making a lot of money?
7. Have you ever raised money for charity?
8. Do you worry about money?

Text 7

Read and translate the text “What Is International Trade?”

When Honduras exports bananas to Switzerland, they can use the money they earn to import Swiss chocolate or to pay for Kuwaiti oil or a vacation in Hawaii. The basic idea of international trade and investment is simple: each country produces goods or services that can be either consumed at home or exported to other countries.

The main difference between domestic trade and international trade is the use of foreign currencies to pay for the goods and services crossing international borders. Although global trade is often added up in U.S. dollars, the trading itself involves various currencies. Japanese videocassette recorders are paid for in Euros in Berlin, and German cars are paid for in U.S. dollars in Boston. Indian tea, Brazilian coffee, and American films are sold around the world in currencies as diverse as Turkish liras and Mexican pesos.

Whenever a country imports or exports goods and services, there is a resulting flow of funds: money returns to the exporting nation, and money flows out of the importing nation. Trade and investment is a two-way street, and with a minimum of trade barriers, international trade and investment usually makes everyone better off. In an interlinked global economy, consumers are given the opportunity to buy the best products at the best prices. By opening up markets, a government allows its citizens to produce and export those things they are best at and to import the rest, choosing from whatever the world has to offer.

Some trade barriers will always exist as long as any two countries have different sets of laws. However, when a country decides to protect its economy by erecting artificial trade barriers, the result is often damaging to everyone, including those people whose barriers were meant to protect.

Free trade is a system in which goods, capital and labor flow freely between nations, without barriers which could hinder the trade process. Many nations have free trade agreements, and several international organizations promote free trade between their members. There are a number of arguments both for and against this practice, from a range of economists, politicians, industries and social scientists.

Answer the questions after the text

1. What is the basic idea of international trade?
2. What is the main difference between domestic and international trade?
3. How can you consider trade barriers?
4. What is the difference between trade and investment?

Text 8

Read the text “The History Of Trade” and make a brief retelling

Trade is the exchange of goods, services or both. Trade is also called commerce. A mechanism that allows trade is called a market. The original form of trade was barter, the direct exchange of goods and services. Modern traders instead generally negotiate through a medium of exchange, such as money. As a result, buying can be separated from selling or earning. The invention of money (and later credit, paper money and non-physical money) greatly simplified and promoted trade.

Trade exists for many reasons. Due to specialization and division of labor, most people concentrate on a small aspect of production, trading for other products.

Trade exists between regions because different regions have a comparative advantage in the production of some tradable commodity, or because different regions' size allows for the benefits of mass production. As such, trade at market prices between locations benefits both locations.

In the era before the rise of the nation state, the term “international” trade cannot be literally applied, but simply means trade over long distances; the sort

of movement in goods which would represent international trade in the modern world. Trade originated with the start of communication in prehistoric times. Trading was the main facility of prehistoric people, who bartered goods and services from each other before the innovation of the modern day currency. From the beginning of Greek civilization until the fall of the Roman empire in the 5th century, a financially lucrative trade brought valuable spice to Europe from the far east, including China. Roman commerce allowed its empire to flourish.

What is money? Read and memorize the definition

Money is a good that acts as a medium of exchange in transactions. Classically it is said that money acts as a unit of account, a store of value and a medium of exchange.

The characteristics of money are:

- Portable – Money must be easy to carry.
- Durable – Money must be able to withstand the wear and tear of many people using it.
- Divisible – Money must be easily divided into small parts so people can purchase goods and services of any price.
- Stable in Value – Money must be stable in value. Its value must remain constant over long periods of time.
- Relatively Scarce – Whatever is used as money must be scarce or hard for people to obtain.
- Acceptable – Whatever is used as money must be accepted as a medium of exchange.

Money has three main functions. Money is *a means of exchange* – without money, we would have to exchange goods and services directly – engage in barter. Money simplifies commercial transactions. *A unit of measurement* – as a unit of measurement, money allows us to compare the value of various goods and services. It is both the standard for pricing goods and services and the means of buying and selling them. Money also allows us to compare prices over time. *A store of value for future use* – as a store of value, money facilitates the accumulation of savings and the lending of those savings to someone else. This attribute of money also makes it easier to enter into a contract – to pay in the future for goods or services received now.

PART 2
UNIT 1
PATON YEVHENII OSKAROVYCH

Ex. 1 Read and memorize the following words and word-combinations

arc – дуга

automatic submerged arc welding – автоматичне зварювання під шаром флюсу

bridge span – проліт моста

to carry out – проводити

consumable – придатний для споживання

equipment and tools – устаткування та інструменти

strength of welded structures – міцність зварювальної конструкції

a reliable technological process – надійний технологічний процес

to restore – відновлювати

a welding laboratory – лабораторія зварювання

Ex. 2 Read and translate the text “Paton Yevhenii Oskarovych”

Yevhenii Oskarovych Paton (1870–1953) graduated from Dresden Politechnic Institute in 1894 and from Petersburg Institute of Railway Roads in 1896. He was a lecturer at Moscow Engineering College of Railway Roads (1899–1904). Yevhenii Oskarovych Paton was a Professor of Kyiv Polytechnic Institute, and the Chairman of the Bridge Department from 1904 to 1938. In 1929 he organized a welding laboratory and Electric Welding Committee. In 1934 Yevhenii Paton founded the Electric Welding Institute of the Academy of Sciences of Ukrainian SSR.

Yevhenii Paton was a pioneer researcher of the new joining – welding technology for the materials. In order to make welding a reliable technological process it was necessary to conduct a comprehensive research of the mechanics of welded structures, welding metallurgical processes and physics of the arc, as well as to develop the welding equipment and tools, and consumables and new welding techniques.

Yevhenii Paton created the methods of design of rational bridge spans, investigated the conditions of their operation and suggested the methods to restore the damaged bridges. He carried out the research on calculation and strength of welded structures, mechanization of welding processes and fundamentals of welding. He supervised the development of the method of automatic submerged arc welding. During the World War II Yevhenii Paton supervised the design and production of the equipment and technology of the automatic welding of special steels, tanks, bombs, etc.

Yevhenii Oskarovych Paton supervised the wide implementation of welding in industry, the design and production of the assembly-welding production lines. He made the design of welded bridges. He founded a domestic school of metal welding. Yevhenii Oskarovych Paton was awarded by almost all the highest scientific awards and prizes and the Title of the Hero of Socialist Labour. Yevhenii Oskarovych Paton was the father of Boris Yevheniiiovych Paton, the President of the National Academy of Sciences of Ukraine.

Ex. 3 Answer the following questions

1. Who is Yevhenii Paton and how did he progress up his career ladder?
2. What did Yevhenii Paton create?
3. What kinds of researches did he carry out?
4. What was Paton responsible for during the World War II?
5. What was Paton’s contribution in industry?

Ex. 4 Match the beginnings and the endings of the sentences

1. Yevhenii Oskarovych Paton was a Professor of Kiev Polytechnic Institute,	a) the Electric Welding Institute of the Academy of Sciences of Ukrainian SSR.
2. During the World War II Yevhenii Paton supervised the design and production of the equipment	b) and production of the assembly-welding production lines.
3. Yevhenii Oskarovych Paton supervised the wide implementation of welding in industry, the design	c) it was necessary to conduct a comprehensive research of the mechanics of welded structures.
4. Yevhenii Paton created the methods of design of rational	d) and from Petersburg Institute of Railway Roads in 1896.

bridge spans,	
5. In 1934 Yevhenii Paton founded	e) investigated the conditions of their operation, and suggested the methods to restore the damaged bridges.
6. He carried out the research on calculation and strength of welded structures,	f) mechanization of welding processes, and fundamentals of welding.
7. Yevhenii Oskarovych Paton graduated from Dresden Politechnic Institute in 1894,	g) and the Chairman of the Bridge Department from 1904 to 1938.
8. In order to make welding a reliable technological process	h) and production of the equipment and technology of the automatic welding of special steels, tanks, bombs.

Ex. 5 From the following list use each word only once to complete the sentences below

Supervised, scientific awards, tanks and bombs, development, graduated from, the President, metal, research, the design, a welding laboratory.

1. Paton was awarded by almost all the highest and prizes.
2. Yevhenii Oskarovych Paton was the father of Boris Evgenievych Paton, of the National Academy of Sciences of Ukraine.
3. Yevhenii Oskarovych Paton Dresden Polytechnic Institute in 1894.
4. He made of welded bridges.
5. Paton the design and production of the equipment.
6. In 1929 he organized and Electric Welding Committee.
7. He supervised the of the method of automatic submerged arc welding.
8. It was necessary to conduct a comprehensive of the mechanics of welded structures, welding metallurgical processes.
9. Paton supervised the design and production of the equipment and technology of the automatic welding of special steels,
10. He founded a domestic school of welding.

Ex. 6 Translate the sentences into English

1. Євген Патон заснував Інститут електрозварювання Академії наук Української РСР.
2. Він проводив дослідження щодо розрахунку і міцності зварних конструкцій та механізації зварювальних процесів.
3. Під час Другої світової війни Євген Патон керував проектами і виробництвом устаткування і технології автоматичного зварювання зі спеціальних сталей, а також танків, бомб і т. д.

4. Він організував лабораторію зварювання та комітет електрозварювання.
5. Патон був нагороджений майже всіма високими науковими нагородами та призами.
6. Вчений створив методи проектування прольоту мостів, були досліджені умови їх експлуатації, а також він запропонував методи відновлення пошкоджених мостів.
7. Патон керував розробкою та виробництвом складально-зварювальних ліній.
8. Патон був дослідником нової з'єднувально-зварювальної технології матеріалів .
9. Він зробив проект зварних мостів.
10. Для того, щоб здійснити зварювання надійним технологічним процесом, необхідно було провести всебічне дослідження технічного обладнання зварних конструкцій.

Ex. 7 Match the left column to the right one and write the definitions of the following words or word combinations

Welding laboratory	someone, especially a man, who is in charge of a meeting or directs the work of a committee or an organization
To mechanize	a place where you can do some researches with joining of metals
Bridge span	A person who is one of the first to do something
To supervise	to use a machine to do something that used to be done by hand
Welding	The length of bridge from one side to the other
Automatic submerged arc welding	A process done automatically by which metals are joined by an arc or arcs between a bare metal electrode or electrodes and the work
Chairman	The activity of joining metal parts together
A pioneer	to be in charge of an activity or person and make sure that things are done in the correct way

UNIT 2 MY FUTURE PROFESSION (WELDERS)

Ex. 1 Read and memorize the following words and word-combinations

certainly – звичайно

conventional – звичайний

to evolve – розвивати

exposure to – піддавання до

GTAW (gas tungsten arc welding) – дугове зварювання вольфрамом
електродом

pharmaceutical – фармацевтичний

refining operations – операції рафінування

SMAW (shielded metal arc weld) – дугове зварювання металевим
електродом

the stringent demands – суворі вимоги

Ex. 2 Read and translate the text “My Future Profession (Welders)”

I'm a student of the 4th course in VNTU. I study in the machine-building department and after the graduation I will become a specialist in welding of materials.

While the technology of welding has evolved dramatically during more than 100 years, the need for skilled welders becomes greater than ever.

In order to become a welder, it is necessary to be reasonably strong in heavy industry, because such a specialist will have to work with heavy materials. Also welders need to think fast as they work with very hot, dangerous materials.

Having a passion for and an interest in metals is certainly useful and knowing your field of interest is of great importance too.

Today's welder must be proficient in multiple welding processes. At the very minimum, he or she must be able to weld all manner of piping using the manual SMAW and GTAW processes. These are necessary skills for meeting the stringent demands of the high-purity piping industry. High purity is an industry within our industry developing out of the manufacture of computer chip and pharmaceutical products. Orbital processes are becoming the preferred method of welding on pipelines, heavy industrial plants such as chemical and refining operations, and also nuclear and conventional power production plants.

A good welder must be ready to operate semi-automatic welding equipment remotely. This is done through the use of modern fiber-optic cameras allowing the welder to watch the welding operation on a video monitor. The remote operation of the welding equipment limits exposure to radiation.

To my mind, my future profession is very important as welding is a crucial stage in the construction of different things like cars, trains and ships, along with industrial equipment. Besides, welders can also work in lighter industry or as freelance contractors who fix various metal objects. The construction industry also employs a lot of welders, as many buildings use heavy duty metal framework to support themselves, and this framework must be assembled and secured by welders.

Ex. 3 Find English equivalents in the text “My Future Profession (Welder)”

на мою думку
дугове зварювання вольфрамним електродом
зварювання матеріалів
необхідні навички
устаткування
волокняно-оптичні камери
заводи важкої промисловості
позаштатний підрядник
напівавтоматичний
дугове зварювання металевим електродом
виробництво
закінчення (навчання)
розвиватися
небезпечні матеріали
відповідати найсуворішим вимогам
досвідчений
легка промисловість
очищення

Ex. 4 Translate the sentences into English

1. Будівельна галузь потребує багато спеціалістів із зварювання.
2. Для того, щоб стати зварювальником, треба бути досить досвідченим у важкій промисловості.
3. У будівництві споруд використовуються рами міцної металевої конструкції .
4. Зварювання є важливим етапом в будівництві автомобілів, поїздів і кораблів.
5. Після закінчення навчання я стану фахівцем у зварюванні матеріалів.
6. Майбутній зварювальник повинен бути спроможним виконувати дугове зварювання металевим електродом.
7. Орбітальні процеси стають передовими методами зварювання.
8. Вони працюють з дуже гарячими та небезпечними матеріалами.
9. Досвідчений зварювальник повинен бути готовий для віддаленого управління напівавтоматичного зварювального обладнання.
10. Сучасний фахівець із зварювання повинен бути досвідченим щодо різноманітності зварювальних процесів.

Ex. 5 Retell the text “My Future Profession (Welders)”

UNIT 3 WELDING

Ex. 1 Read and memorize the following words and word-combinations

alligator clips – зубчасті зажими

a beam – балка

a bond – зв’язок, поєднання

flux – флюс

melting – плавлення

pipelines – трубопроводи

semiautomatic welding – напівавтоматичне зварювання

strong electrical current – сильний електричний струм

welding – зварювання

welding rod – зварювальний електрод

Ex. 2 Read and translate the text “Welding”

Welding is the most common way of permanently joined metal parts. In this process, heat is applied to metal pieces, melting and fusing them to form a permanent bond. Because of its strength, welding is used in shipbuilding, automobile manufacturing and repair, aerospace applications and thousands of other manufacturing activities. Welding also is used to join beams when constructing buildings, bridges and other structures, and to join pipes in pipelines, power plants and refineries.

Welders use many types of welding equipment set up in a variety of positions, such as flat, vertical, horizontal and overhead. They may perform manual welding, in which the work is entirely controlled by the welder or semiautomatic welding, in which the welder uses machinery, such as a wire feeder to perform welding tasks.

There are about 100 different types of welding. Arc welding is the most common type. Standard arc welding involves two large metal alligator clips that carry a strong electrical current. One clip is attached to any part of the workpiece being welded. The second clip is connected to a thin welding rod. When the rod touches the workpiece, a powerful electrical circuit is created. The massive heat created by the electrical current causes both the workpiece and the steel core of the rod to melt together, cooling quickly to form a solid bond. During welding, the flux that surrounds the rod's core vaporizes, forming an inert gas that serves to protect the weld from atmospheric elements that might weaken it. Welding speed is important. Variations in speed can change the amount of flux applied, weakening the weld or weakening the surrounding metal by increasing heat exposure.

Ex. 3 Answer the following questions

1. What is welding?
2. What is the role of heat in the process of welding?
3. Where is welding used?
4. What is the difference between manual and semiautomatic welding?
5. How many types of welding are there?
6. What is the purpose of speed in welding?

Ex. 4 Match the beginnings and the endings of the sentences

1. Welding is the most common way	a) such as flat, vertical, horizontal and overhead.
2. They may perform manual welding,	b) that carry a strong electrical current.
3. During welding, the flux that surrounds the rod's core vaporizes, forming an inert gas	c) and the steel core of the rod to melt together, cooling quickly to form a solid bond.
4. Welding also is used to join beams	d) a powerful electrical circuit is created.
5. Welders use many types of welding equipment set up in a variety of positions,	e) when constructing buildings, bridges and other structures
6. When the rod touches the workpiece,	f) that serves to protect the weld from

	atmospheric elements that might weaken it.
7. The massive heat created by the electrical current causes both the workpiece	g) of permanently joined metal parts.
8. Standard arc welding involves two large metal alligator clips	h) in which the work is entirely controlled by the welder

Ex. 5 From the following list, use each word only once to complete the sentences below

permanently, clip, connected, semiautomatic, strength, arc welding, flux, permanent bond, equipment, surrounds

1. The second clip is to a thin welding rod.
2. During welding, the flux that the rod's core vaporizes.
3. In welding the welder uses machinery, such as a wire feeder to perform welding tasks.
4. Heat is applied to metal pieces, melting and fusing them to form a
5. Welders use many types of welding set up in a variety of positions, such as flat, vertical, horizontal and overhead.
6. One is attached to any part of the workpiece being welded.
7. During welding, the that surrounds the rod's core vaporizes.
8. Welding is the most common way of joined metal parts.
9. is the most common type.
10. Because of its, welding is used in shipbuilding, automobile manufacturing and thousands of other manufacturing activities.

Ex. 6 Match the left column to the right one and write the definitions of the following words or word combinations

Heat	The complete circle that an electric current travels
Semiautomatic welding	The way of permanently joined metal parts
A bond	The state of becoming liquefied from heat
Fusing	Thermal energy
Electrical circuit	A transmission line that feeds the electricity for an electricity substation or for a transmitter

A wire feeder	A chemical agent for cleaning metal prior to soldering or welding
Welding	The process when the welder uses machinery, such as a wire feeder to perform welding tasks
Flux	The connection of two surfaces that are glued together

Ex. 7 Translate the sentences into English

1. Зміни швидкості можуть сприяти змінам у кількості застосованого флюсу.
2. У цьому процесі для металевих деталей використовується гаряче повітря, і в результаті цього відбувається плавлення з подальшим утворенням шва.
3. Зварювання є найбільш поширеним засобом безперервного поєднання металевих частин.
4. Коли електрод торкається заготовки, то утворюється потужний електричний ланцюг.
5. Звичайне дугове зварювання потребує два великих металевих зубчастих зажими, які знаходяться під дією сильного електричного струму.
6. Зварювання використовується для з'єднання балок при спорудженні будівель, мостів та ін.
7. Зварювальники застосовують багато видів зварювального устаткування, встановленого в різних позиціях.
8. Ручне зварювання – це процес, в якому робота повністю відбувається під контролем зварника.
9. Дугове зварювання є найбільш поширеним різновидом.
10. Інший зажим під'єднаний до тонкого зварювального електрода.

UNIT 4 CLASSIFICATIONS OF STEEL

Ex. 1 Read and memorize the following words and word-combinations

alloy steels – леговані сталі

axles – вісі

carbon steels – вуглецев сталі

to contain – містити

frameworks – каркаси

girders – балки, бруси

HSLA – низьколеговані сталі високої міцності

processed – оброблені

ship hulls – корпус корабля

silicon – кремній

Ex. 2 Read and translate the text “Classifications Of Steel”

Steels are grouped into several main classifications.

Carbon Steels

More than 90 percent of all steels are carbon steels. They contain varying amounts of carbon and not more than 1.65 percent manganese, 0.60 percent silicon, and 0.60 percent copper. Machines, automobile bodies, most structural steel for buildings, ship hulls, bedsprings, and bobby pins are among the products made of carbon steels.

Alloy Steels

These steels have a specified composition, containing certain percentages of vanadium, molybdenum, or other elements, as well as larger amounts of manganese, and copper than do the regular carbon steels. Automobile gears and axles, roller skates, and carving knives are some of the many things that are made of alloy steels.

High-Strength Low-Alloy Steels

Called HSLA steels, they are the newest of the five chief families of steels. They cost less than the regular alloy steels because they contain only small amounts of the expensive alloying elements. They have been specially processed, however, to have much more strength than carbon steels of the same weight. For example, freight cars made of HSLA steels can carry larger loads because their walls are thinner than would be necessary with carbon steel of equal strength. Numerous buildings are now being constructed with frameworks of HSLA steels. Girders can be made thinner without sacrificing their strength, and additional space is left for offices and apartments.

Ex. 3 Answer the following questions

1. What are the main classifications of steels?
2. What do the carbon steels contain?
3. Where are carbon steels used?
4. Do the alloy steels have the same composition as carbon steels?
5. Why do HSLA cost less than alloy steels?

Ex. 4 Match the beginnings and the endings of the sentences

1. Numerous buildings are now being constructed	a) 0.60 percent silicon, and 0.60 percent copper.
2. They cost less than the regular alloy steels	b) and bobby pins are among the products made of carbon steels.
3. Alloy steels have a specified composition,	c) to have much more strength than carbon steels of the same weight.
4. Girders can be made thinner without sacrificing their strength,	d) that are made of alloy steels.
5. Automobile bodies, most structural steel for buildings, ship hulls, bedsprings,	e) containing certain percentages of vanadium, molybdenum, or other elements.

6. HSLA steels have been specially processed, however,	f) with frameworks of HSLA steels.
7. They contain varying amounts of carbon and not more than 1.65 percent manganese,	g) and additional space is left for offices and apartments.
8. Roller skates, and carving knives are some of the many things	h) because they contain only small amounts of the expensive alloying elements.

Ex. 5 From the following list, use each word only once to complete the sentences below

thinner, ship hulls, carving knives, alloy steels, the newest, HSLA, contain, several, frameworks, carbon steels

1. contain certain percentages of vanadium, molybdenum, or other elements.
2. Freight cars made of steels can carry larger loads.
3. Steels are grouped into main classifications.
4. HSLA steels are of the five chief families of steels.
5. Machines, automobile bodies,, bedsprings, and are among the products made of carbon steels.
6. Numerous buildings are now being constructed with of HSLA steels.
7. HSLA steels have much more strength than of the same weight.
8. Roller skates, and are some of the many things that are made of alloy steels.
9. The walls of cars made of HSLA steels are
10. HSLA cost less than the regular alloy steels because they small amounts of the expensive alloying elements.

Ex. 6 Guess the words from the text

1. This car can carry heavy loads (7 letters).
2. This thing is done from carbon steels and it is used by girls (2 words).
3. When we need to cut a piece of something we use this thing (2 words).
4. These steels contain molybdenum (2 words).
5. Opposite to cheap (9 letters).
6. Carbon steel contains 0,60 of this element (6 letters).
7. Synonym to “machined” (9 letters).
8. The bar connecting two wheels in a car or other vehicle (4 letters).
9. The quality of being strong (8 letters).
10. A strong beam, made of iron or steel, that supports a floor, roof, or bridge (6 letters).
11. A quantity of something such as time, money, or a substance (6 letters).
12. It’s an adjective, a synonym to “many” (8 letters).

13. A set of rooms on one floor of a large building, where someone lives (9 letters).
14. Synonym to “for instance” (2 words).
15. Special boots with four wheels fixed under them (2 words).

UNIT 5 GAS METAL ARC WELDING

Ex. 1 Read and memorize the following words and word-combinations

alternating current – змінний струм

constant current – постійний струм

continuous – безперервний

GMAW (Gas metal arc welding) – дугове зварювання вольфрамовим електродом

MIG (metal inert gas) – зварювання металевим електродом в середовищі інертного газу

pulsed-spray – пульсуюче розпорскування

shielding gas – захисний газ

spray – розпорскування

versatility – різноманітність; гнучкість

volatility – випаровування

welding gun – зварювальний пістолет

Ex. 2 Read and translate the text “Gas Metal Arc Welding”

Gas metal arc welding (GMAW), sometimes referred to by its subtype metal inert gas (MIG) welding, is a semi-automatic or automatic arc welding process in which a continuous and consumable wire electrode and a shielding gas are fed through a welding gun.

A constant voltage, direct current power source is most commonly used with GMAW, but constant current systems, as well as alternating current, can be used. There are four primary methods of metal transfer in GMAW, called globular, short-circuiting, spray, and pulsed-spray, each of which has distinct properties and corresponding advantages and limitations.

Originally developed for welding aluminum and other non-ferrous materials in the 1940s, GMAW was soon applied to steels because it allowed for lower welding time compared to other welding processes. The cost of inert gas limited its use in steels until several years later, when the use of semi-inert gases such as carbon dioxide became common.

Further developments during the 1950s and 1960s gave the process more versatility and as a result, it became a highly used industrial process. Today, GMAW is the most common industrial welding process, preferred for its versatility, speed and the relative ease of adapting the process to robotic automation. The automobile industry in particular uses GMAW welding almost exclusively. Unlike welding processes that do not employ a shielding gas, such as shielded metal arc welding, it is rarely used outdoors or in other areas of air volatility. A related process, flux cored arc welding, often does not utilize a shielding gas, instead employing a hollow electrode wire that is filled with flux on the inside.

Ex. 3 Answer the following questions

1. Give the definition of the GMAW.
2. What type of current is used in GMAW?
3. How many methods of metal transfer are there in GMAW? What are they?
4. What was the original purpose of GMAW?
5. What facts are known about the usage of GMAW in 1950s and 1960s?
6. Why is GMAW so popular nowadays?

Ex. 4 Match the beginnings and the endings of the sentences

1. The automobile industry in particular	a) but constant current systems, as well as alternating current, can be used.
2. Direct current power source is most commonly used with GMAW,	b) and as a result, it became a highly used industrial process.

3. The cost of inert gas limited its use in steels until several years later,	c) instead employing a hollow electrode wire that is filled with flux on the inside.
4. Today, GMAW is the most common industrial welding process, preferred for its versatility, speed	d) it is rarely used outdoors or in other areas of air volatility.
5. There are four primary methods of metal transfer in GMAW,	e) when the use of semi-inert gases such as carbon dioxide became common.
6. Flux cored arc welding, often does not utilize a shielding gas,	f) called globular, short-circuiting, spray, and pulsed-spray.
7. Unlike welding processes that do not employ a shielding gas, such as shielded metal arc welding,	g) uses GMAW welding almost exclusively.
8. Further developments during the 1950s and 1960s gave the process more versatility	h) and the relative ease of adapting the process to robotic automation.

Ex. 5 Find English equivalents in the text “Gas Metal Arc Welding” and make up your own sentences

- 1) виключно
- 2) використовувати
- 3) змінний струм
- 4) розвиток
- 5) властивості
- 6) кольорові метали
- 7) флюс
- 8) поєднуючи з
- 9) всередині
- 10) переваги
- 11) промисловий процес
- 12) придатний до застосування; розплавлений (електрод)
- 13) відносний
- 14) вуглець

Ex. 6 Match the left column to the right one and write the definitions of the following words or word combinations

Direct current	is a semi-automatic or automatic arc welding process in which a continuous and consumable wire electrode and a shielding gas are fed through a
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	welding gun.
Volatility	employs a hollow electrode wire that is filled with flux on the inside.
Industrial process	a flow of electricity that moves in one direction only
Flux	is used in GTAW to protect the weld area from atmospheric gases, such as oxygen, nitrogen and water vapour
Flux cored arc welding	a flow of electricity that changes direction regularly and quickly
Gas metal arc welding	a substance applied to a surface to be joined by welding, to prevent the formation of oxides
Shielding gas	a systematic series of mechanical or chemical operations that produce or manufacture something
Alternating current	the state of evaporating

Ex. 7 From the following list, use each word only once to complete the sentences below

welding time, commonly, alternating current, semi-inert gases, versatility, until, a welding gun, applied to, uses, the process

1. A constant voltage, direct current power source is most used with GMAW.
2. The automobile industry in particular GMAW welding almost exclusively.
3. Constant current systems, as well as, can be also used.
4. GMAW was soon steels because it allowed for lower welding time compared to other welding processes.
5. During the 1950s and 1960s became more versatile.
6. A shielding gas is fed through
7. The cost of inert gas limited its use in steels several years later.
8. Today, GMAW is preferred for its, speed and the relative ease of adapting the process to robotic automation.
9. It allowed for lower compared to other welding processes.
10. The use of such as carbon dioxide became common.

UNIT 6

CONVENTIONAL TYPES OF WELDING

Ex. 1 Read and memorize the following words and word-combinations

accumulation – накопичення

dams – перегородки для відсіку проходження газів під час зварювання

Electroslag welding – електрошлакове зварювання

Flux Cored Arc Welding – дугове зварювання трубчатим електродом

hot jet – гарячий струмінь

is deposited – відкладається

MIG welding (metal inert gas welding) – дугове зварювання плавленим електродом в інертному газі

parent metal – основний метал

Shielded metal arc welding – зварювання в захисному шарі

slag – шлак

Submerged arc welding – дугове зварювання під флюсом

TIG welding – газовольфрамене зварювання

tubular – трубчатий

versatile – універсальний

a weld puddle – ванна для зварювання

to withdraw – вилучати, знімати

Ex. 2 Read and translate the text “Conventional Types Of Welding”

There are basically three types of welding: arc welding, MIG welding and TIG welding. These are further divided into different types.

Arc Welding

In this type of welding the concentrated heat of an electric arc is used to weld metals. A metal provided by an electrode is added to the parent metal which can be any metal using the electrical arc.

Direct or alternating current for the arc may be used depending upon the metal being welded and the electrode being used.

Arc welding is of following types: *Fluxed Core Arc Welding, Electroslag welding, Gas metal arc welding, Plasma arc welding, Shielded metal arc welding and Submerged arc welding.*

Electroslag Welding

In this type of welding, a filler wire that forms the arc is used to make a weld metal which is deposited in the space between two metal plates that are to be joined. To enclose the space between the plates water cooled copper dams are used.

Flux Cored Arc Welding

In flux cored arc welding a tubular electrode is used which is filled with flux. This flux is less brittle as compared to other coatings used in the electrodes of arc welding.

Gas Metal Arc Welding

Gas metal arc welding is a comparatively simpler method than the above mentioned arc welding types in which an inert gas or a combination of different gases shield the welding zone and prevent any sort of oxidation in the weld puddle. The gas metal arc welding is also very economical.

Plasma Arc Welding

In the plasma arc welding electrodes and ionized gases are used which generate an extremely hot jet of plasma on the metal plates which are supposed to be welded.

Shielded Metal Arc Welding

This method of welding is the oldest and the simplest type of welding and is also very versatile. The electrical arc in this type of welding is produced by

touching the tip of the electrode with the metal plate and withdrawing quickly. Balancing and maintaining the arc during welding is very important.

To ensure a good weld, the slag formed at each turn must be removed in order to prevent accumulation of oxides and nitrites.

Submerged Arc Welding

In the submerged arc welding a granular flux is added into the weld zone which forms a thick layer, protecting and shielding the molten slag. This flux also prevents the sparks and acts as a thermal insulator.

The process is however restricted to the welding done in the horizontal position and is mostly used for plate steel welding in semi-automatic or automatic configurations.

MIG Welding

The MIG welding which means metal inert gas welding is a method of welding in which an aluminum alloy wire, electrode and the filler material is used. The filler material used is a metal which is constantly added during the welding and without it the welding is not possible. The process is also called a semi-automatic welding as all the welding parameters in type of welding are controlled by the welding machine.

In the MIG process a direct current power source is used. The positive electrode used removes the oxide layer formed on the aluminum surface. There are two types of MIG welding: *Conventional MIG and Pulsed MIG*.

The conventional MIG has a limited range of arc current or the heat input because of which, using this process a material with a thickness of more than 4 mm cannot be welded.

In *the pulsed MIG* the DC power source is used at superimposed periodic pulses of high current. When the current levels are low, the arc is maintained without transferring of the metal. And when the level is high the metal is sprayed during the welding.

TIG Welding

In the TIG welding or the tungsten inert gas welding a permanent electrode which is non-melted is used. In this type of welding the filler material is added separately because of which the process is very flexible. The process can be carried without the filler material unlike the MIG. The alternating current is used for this process. However the direct current can also be used but mostly AC is used.

Ex. 3 Answer the following questions

1. What are the main three types of welding described in the text?
2. How is Arc welding subdivided?
3. What are the peculiarities of Electroslag welding?
4. Why is the Fluxed Core Arc Welding given such a name?
5. What is known about Gas metal arc welding?
6. What kind of jet is used in Plasma arc welding?

7. Is there any difference between Shielded metal arc welding and Submerged arc welding?
8. How is MIG welding subdivided?
9. What is the difference between MIG welding and TIG welding?

Ex. 4 From the following list, use each word only once to complete the sentences below.

maintained, accumulation, welding, sprayed, three, economical, during, sparks, permanent, material, limited, however, used, cooled

1. In arc welding the concentrated heat of an electric arc is to weld metals.
2. To enclose the space between the plates water copper dams are used.
3. the direct current can also be used.
4. The conventional MIG has a range of arc current.
5. In the tungsten inert gas welding a electrode which is non-melting is used.
6. The filler used is a metal which is constantly added during the welding.
7. Flux also prevents the and acts as a thermal insulator.
8. The gas metal arc welding is very
9. Balancing and maintaining the arc welding is very important.
10. There are basically types of welding.
11. When the current levels are low, the arc is without transferring the metal.
12. In the submerged arc a granular flux is added into the weld zone which forms a thick layer.
13. When the level is high the metal is during the welding.
14. To ensure a good weld, the slag formed at each turn must be removed in order to prevent of oxides and nitrides.

Ex. 5 Find English equivalents in the text “Conventional Types Of Welding”

- 1) електрична дуга
- 2) звичайне дугове зварювання плавленням електродом в інертному газі
- 3) край, кінчик
- 4) діапазон струму дуги
- 5) рівень
- 6) утримання
- 7) розплавлений шлак
- 8) іонізовані гази
- 9) постійно додається
- 10) запобігати
- 11) окислення
- 12) джерело живлення

- 13) менш ламкий
- 14) гнучкий
- 15) періодичні імпульси високого струму
- 16) оксидний шар
- 17) покриття
- 18) зона зварювання
- 19) в порівнянні з

Ex. 6 Make up the sentences from the mixed words

- 1) process, the, be, can, without, carried, material, the, filler.
- 2) arc, the, the, maintained, is, of, transferring, metal, without.
- 3) process, the, also, is, a, called, welding, semi-automatic.
- 4) the, in, MIG, pulsed, the, DC, source, power, used, at, is, periodic, current, superimposed, pulses of, high.
- 5) parent, the, which, metal, be, can, metal, any, the, using, arc, electrical.
- 6) electrical, the, arc, produced, is, touching, by, the, of, tip, the, with, electrode, the, metal, and, plate, quickly, withdrawing.
- 7) direct, alternating, or, for, current, the, may, arc, used, be, upon, depending, the, welded, being, metal.
- 8) method, this, of, is, welding, the, and, oldest, simplest, the, type, welding, of, is, also, and, versatile, very.
- 9) positive, the, electrode, the, oxide, removes, formed, layer, the, aluminum, on, surface.
- 10) wire, a, filler, is, to, used, a, make, metal, welded.

Ex. 7 Which of the listed below statements are true or false. Specify your answer using the text

1. In the pulsed MIG the AC power source is used a superimposed periodic pulses of high current.
2. In TIG welding the concentrated heat of an electric arc is used to weld metals.
3. The positive electrode used removes the oxide layer formed on the aluminum surface.
4. In the submerged arc welding a granular flux is added into the weld zone which forms a thick layer.
5. Direct or alternating current for the arc may be used depending upon the metal being welded and the electrode being used.
6. In the MIG welding or the tungsten inert gas welding a permanent electrode which is non-melted is used.
7. Balancing and maintaining the arc during welding is not of great necessity.
8. When the current levels are low, the arc is maintained without transferring of the metal.
9. The gas metal arc welding is also very economical.

10. In submerged arc welding a tubular electrode is used which is filled with flux.

UNIT 7 PROPERTIES OF MATERIALS

Ex. 1 Read and memorize the following words and word-combinations

conductivity – провідність

contamination – забруднення

to correlate – співвідносити
CTE (coefficient of thermal expansion) – коефіцієнт термічної провідності
to exhibit – виставляти
expulsion – видалення
failure – недолік, відсутність
to impair – ослабляти, погіршувати
inconsistent welds – несумісні шви при зварюванні
inhibiting – перешкоджаючи
mismatch – невідповідність
seeming contradiction – зовнішнє протиріччя

Ex. 2 Read and translate the text “Properties Of Materials”

Electrical resistivity

Low resistance metals, e.g. copper, require larger currents to produce the same amount of heat. Low resistance materials also exhibit low contact resistance.

Thermal conductivity

Metals with high thermal conductivity, e.g. copper, exhibit high electrical conductivity. The heat generated in high thermal conductivity materials is rapidly conducted away from the region of the weld. For metallic materials, the electrical and thermal conductivity correlate positively, i.e. materials with high electrical conductivity (low electrical resistance) exhibit high thermal conductivity.

Thermal expansion

Softer metals exhibit a high coefficient of expansion (CTE); whereas harder materials, such as tungsten, exhibit a low CTE. A CTE mismatch between two workpieces can result in significant residual stresses at the joint which, when combined with the applied stresses, can cause failure at lower pull strengths.

Hardness and strength

In seeming contradiction to the “rule of opposites”, hard material workpieces generally require harder electrodes (which exhibit lower conductivity) due to the higher weld forces required.

Plastic temperature range is the temperature range in which a material can be deformed easily (melt) under the application of force. Steels and alloys exhibit a wide plastic temperature range and thus are easy to fusion weld. The natural elements, copper and aluminum exhibit a narrow plastic temperature range. Accurate control of the weld temperature is critical to avoid excessive melting.

Polarity should be considered when using all power supply technologies. If any of the interfaces of a resistance weld (between electrodes and workpieces or between the workpieces to be joined) is composed of dissimilar materials, that interface will heat or cool depending on the polarity of the applied potential. The effects of polarity can be minimized or controlled via the use of contrasting size

electrode forces and/or weld pulses of alternating polarity. Other material related parameters affect the resistance welding process, and must therefore be controlled.

Oxide contamination causes inconsistent welds by inhibiting intimate contact at the weld joint. Preventive actions include pre-cleaning the workpieces, increasing the weld force to push aside the oxide, and/or using a cover gas during welding to prevent additional oxide formation.

Surface roughness can also result in localized over/under heating, electrode sticking and/or material expulsion. The same rule applies to all three material parameters: any surface condition that impairs intimate workpiece contact to each other and to the electrodes will inhibit good welding.

Heat imbalance and heat sinks can result in unexpected heat loss or indirection. Heat must be concentrated at the point of the weld to insure correct and consistent welds.

Ex. 3 Answer the following questions

1. What types of properties do the metals possess?
2. What characteristic does the thermal conductivity have?
3. Why is polarity important?
4. What does oxide contamination cause?
5. What can heat imbalance result?
6. Which property is necessary to have for hard material workpieces?
7. What do low resistance metals need?
8. Why is plastic temperature range so essential?
9. What can surface roughness result?

Ex. 4 From the following list, use each word only once to complete the sentences below

exhibit, conductivity, polarity, fusion, inconsistent, thermal, metallic, to insure, expansion, contrasting

1. should be considered when using all power supply technologies.
2. Steels and alloys are easy to weld.
3. Metals with high conductivity exhibit high electrical conductivity.
4. Heat must be concentrated at the point of the weld correct and consistent welds.
5. The effects of polarity can be minimized or controlled via the use of size electrode forces.
6. Materials with high electrical exhibit high thermal conductivity.
7. Softer metals exhibit a high coefficient of
8. For materials, the electrical and thermal conductivity correlate positively.

9. The natural elements, copper and aluminum a narrow plastic temperature range.
10. Oxide contamination causes welds by inhibiting intimate contact at the weld joint.

Ex. 5 Match the beginnings and the endings of the sentences

1. The effects of polarity can be minimized or	a) unexpected heat loss or indirection.
2. Preventive actions include pre-cleaning the workpieces,	b) result in significant residual stresses at the joint.
3. Hard material workpieces generally require harder electrodes due	c) thus are easy to fusion weld.
4. Low resistance materials also	d) controlled via the use of contrasting size electrode forces and/or weld pulses of alternating polarity.
5. Heat sinks can result in	e) the electrical and thermal conductivity correlate positively.
6. A coefficient of thermal expansion mismatch between two workpieces can	f) increasing the weld force to push aside the oxide.
7. Steels and alloys exhibit a wide plastic temperature range and	g) to the higher weld forces required.
8. For metallic materials,	h) exhibit low contact resistance.

Ex. 6 Make up a short presentation about properties of materials

**UNIT 8
SAFETY EQUIPMENT FOR WELDING**

Ex. 1 Read and memorize the following words and word-combinations

ear muffs – захисні протишумові навушники

ear plugs – затикачки для вух (беруші)

to emit – виділяти, розповсюджувати

exposure limits – межі впливу

face shields – запобіжні щити

fumes – гази, випаровування

goggles – захисні окуляри

hazardous – небезпечний

a helmet – шолом

an injury – травма

insulated – ізольовані

OSHA (The Occupational Safety and Health Administration) – Адміністрація професійної безпеки і охорони здоров'я

PPE (personal protective equipment) – захисні засоби

steel-toe boots – взуття з металевим носком

Ex. 2 Read and translate the text “Safety Equipment For Welding”

Hazards

Welding can be hazardous because of the high temperatures, sparks, fumes and radiation emitted. If a welder is not properly protected, these hazards can lead to severe burns, eye injuries or even death. The Occupational Safety and Health Administration, OSHA, estimates that four out of every 1,000 welders will die as a result of a workplace injury. Fortunately, personal protective equipment, or PPE, is available in addition to strict federal regulations.

Regulations

OSHA has very specific regulations that employers and welders must follow to ensure safety. These regulations focus on everything from the environment in which the welding is taking place, the types of protective equipment and exposure limits in regards to gases and fumes.

Head and Neck Protection

OSHA requires that all welders wear helmets and eye protection to protect the head, neck and eyes. The helmet must be thermally insulated so the high temperatures do not affect the skin. The helmet should also protect the entire face, neck and ears. In regards to eye protection, goggles, face shields or welding curtains are implemented depending on the type of welding. When goggles are worn, they should be well ventilated in order to avoid fogging. They should also have side and top protection when worn under your helmet. When face shields are indicated they must be shaded. The shield darkness required depends on the process and arc current. Many manufacturers offer shields that darken automatically when the torch is lit. This allows a welder to see his work when the flame is out, without lifting the shield. Generally, the higher the arc current, the darker the shield must be. Curtains or windows are usually used in

training and demonstration. The American Welding Society also recommends ear plugs to prevent sparks from flying in and injuring the ears and ear muffs when the noise levels are high.

Body Protection

When it comes to overall body protection, welders should wear hand shields that are thermally insulated and fire-resistant. Many welders wear leather aprons to protect their bodies, while others wear welding coats or suits. Leather, steel-toe boots are also recommended to protect your feet and ankles. Because of the gases and fumes welding emits, there are also extensive requirements in regards to respirators that protect a welders airway.

Ex. 3 Answer the following questions

1. Why is welding hazardous?
2. What kinds of regulations does OSHA have?
3. What is the purpose of a helmet?
4. What other things can be used besides helmets to protect the head, neck and eyes?
5. Which goggles are preferable?
6. What features should the face shields possess?
7. Why is it necessary to protect the whole body of a welder?

Ex. 4 Match the left column to the right one and write the definitions of the following words or word combinations

Helmet	A type of spectacles used to protect the eyes from dust, water, sparkles
Ear plugs	A broad piece of rigid material to protect one's face
Flame	Gases ejected from an engine as waste products
Apron	To prevent the passage of heat, electricity, or sound into or out of
Goggles	A garment covering part of the front of the body
To insulate	A head protective covering of hard material
Fumes	The hot mixture of burning gases and tiny particles that arises from combustion
Face shields	An object made of a soft material, such as cotton or rubber, and fitted into the ear to block the entry of water or sound

Ex. 5 Find English equivalents in the text “Safety Equipment For Welding”

- 1) рекомендувати

- 2) жаростійкий
- 3) шкіряний фартук
- 4) уникати запотівання (запрівання)
- 5) іскри
- 6) травми на робочому місці
- 7) сильні опіки
- 8) взуття з металевим носком
- 9) рівень шуму
- 10) захист очей
- 11) зварювальні штори
- 12) провітрений, провентильований

Ex. 6 Make up the sentences from the mixed words

- 1) should, welders, hand, wear, that, shields, thermally, are, insulated.
- 2) helmet, the, be, must, insulated, thermally.
- 3) regulations, these, on, focus, from, everything, environment, the, in, the, which, welding, taking, is, place.
- 4) welders, many, leather, wear, to, aprons, their, protect, bodies.
- 5) are, there, extensive, also, in, requirements, to, regards, respirators.
- 6) protective, personal, equipment, available, is, addition, in, strict, to, regulations, federal.
- 7) should, goggles, well, be, in, ventilated, to, order, avoid, fogging.
- 8) can, welding, fumes, hazardous, be, of, because, high, the, sparks, and, radiation, emitted, temperatures.
- 9) manufacturers, many, shields, offer, darken, that, automatically.
- 10) higher, the, arc, the, the, current, the, shield, darker, be, must.

UNCONVENTIONAL WELDING

Ex. 1 Read and memorize the following words and word-combinations

avoidance – уникання

bloodstream – кровотік

energy coupling device – пристрій для передачі енергії

executing marine engineering – виконавче морське проектування

gas rigs – газові установки

high-frequency – високочастотний

OFW (Oxy fuel gas welding) – газополуменеве кисневе зварювання

to oscillate – коливатися

oxyacetylene – киснево-ацетиленовий

oxyhydrogen – водокисневий

pressure – тиск

sealing – пломбування, ізолювання

USW (Ultrasonic welding) – ультразвукове зварювання

Ex. 2 Read and translate the text “Unconventional Welding”

Oxyfuel Gas Welding (OFW)

Oxyfuel gas welding is a group of welding processes which produces coalescence by heating materials with an oxyfuel gas flame or flames with or without the application of pressure and with or without the use of filler metal. There are four distinct processes within this group and in the case of two of them, oxyacetylene welding and oxyhydrogen welding, the classification is based on the fuel gas used. The heat of the flame is created by the chemical reaction or the burning of the gases. In the third process, air acetylene welding, air is used instead of oxygen, and in the fourth category, pressure gas welding, pressure is applied in addition to the heat from the burning of the gases. This welding process normally utilizes acetylene as the fuel gas.

Laser welding

Laser welding is accomplished when the light energy emitted from a laser source is focused upon a workpiece to fuse materials together. The limited availability of lasers of sufficient power for most welding purposes has so far restricted its use in this area. Another difficulty is that the speed and the thickness that can be welded are controlled not so much by power but by the thermal conductivity of the metals and by the avoidance of metal vaporization at the surface. The process is useful in the joining of miniaturized electrical circuitry.

Ultrasonic Welding (USW)

Ultrasonic welding is a solid state welding process which produces coalescence by the local application of high-frequency vibratory energy as the work parts are held together under pressure. Welding occurs when the ultrasonic

tip or electrode, the energy coupling device, is clamped against the work pieces and is made to oscillate in a plane parallel to the weld interface. The combined clamping pressure and oscillating forces introduce dynamic stresses in the base metal. This produces minute deformations which create a moderate temperature rise in the base metal at the weld zone. This coupled with the clamping pressure provides for coalescence across the interface to produce the weld. This process is used extensively in the electronics, aerospace, and instrument industries. It is also used for producing packages and containers and for sealing them.

Underwater welding

Underwater welding is a technique commonly used in executing marine engineering projects such as installation and maintenance of oil and gas rigs, platforms and sub-sea structures. Underwater welding is a necessary part of the maintenance of any metal structure that exists below the water. Underwater welding can be classified according to the type of equipment used and the type of processes followed. The most common underwater welding process is known as MMA manual metal arc welding which has the advantage of being relatively insensitive to depth. Underwater welding techniques can be dangerous, even fatal if proper procedures and equipment is not used. An underwater welder faces the potential risk from electric shocks and from nitrogen introduced into the bloodstream during exposure to air at increased pressure.

Ex. 3 Answer the following questions

1. What is Ultrasonic welding?
2. What is Oxyfuel gas welding?
3. Why can Underwater welding be dangerous?
4. Where is Ultrasonic welding used?
5. According to what processes is Oxyfuel gas welding divided?
6. What is Underwater welding?
7. Which difficulties can a welder face in the process of Laser welding?
8. What is the name of the most common underwater welding process?
9. What is Laser welding?

Ex. 4 From the following list use each word only once to complete the sentences below

underwater welding, category, ultrasonic welding, miniaturized, oscillating, faces, oxyfuel gas welding, restricted

1. is used extensively in the electronics, aerospace, and instrument industries.
2. An underwater welder the potential risk from electric shocks.
3. There are four distinct processes within
4. The limited availability of lasers of sufficient power for most welding purposes has so far its use in this area.

5. The combined clamping pressure and forces introduce dynamic stresses in the base metal.
6. In the fourth, pressure gas welding, pressure is applied in addition to the heat from the burning of the gases.
7. is a technique commonly used in executing marine engineering projects.
8. Laser welding is useful in the joining of electrical circuitry.

Ex. 5 Make up the sentences from the mixed words

- 1) be, welding, techniques, underwater, can, dangerous.
- 2) has, MMA, advantage, the, of, relatively, being, to, insensitive, depth.
- 3) welding, this, normally, process, acetylene, utilizes, as, fuel, the, gas.
- 4) heat, the, the, flame, of, created, is, the, by, reaction, chemical.
- 5) speed, the, the, thickness, and, controlled, so, much, are, by, power, not.
- 6) most, the, underwater, MMA, common, process, is, as, welding, known.
- 7) welding, underwater, a, necessary, is, any, of, the, part, maintenance, of, structure, metal.
- 8) occurs, welding, the, when, tip, ultrasonic, electrode, or, is, against, clamped, work, the, pieces.

Ex. 6 Which of the listed below statements are true or false. Specify your answer using the text

1. The limited availability of lasers of sufficient power for most welding purposes has so far restricted its use in this area.
2. Ultrasonic welding is a necessary part of the maintenance of any metal structure that exists below the water.
3. Ultrasonic welding is used extensively in the electronics, aerospace, and instrument industries.
4. Underwater welding is a technique commonly used in executing marine engineering projects such as installation and maintenance of oil and gas rigs, platforms and sub-sea structures.
5. The most common underwater welding process is known as MIG.
6. Ultrasonic welding is a solid state welding process which produces coalescence by the local application of high-frequency vibratory energy as the work parts are held together under pressure.
7. There are five distinct processes within oxyfuel welding process.
8. Laser welding is accomplished when the light energy emitted from a laser source is focused upon a workpiece to fuse materials together.
9. The combined clamping pressure and oscillating forces introduce dynamic stresses in the filler metal.
10. In underwater welding the heat of the flame is created by the chemical reaction or the burning of the gases.

PART 3
EXAMINATION QUESTIONS
FOR THE MASTER'S DEGREE STUDENTS

1. What is the connection between education and the jobs market?

It is often said that education is a passport to good jobs. Better-educated workers can be more productive than less skilled workers. As jobs market is expanding, so is the supply of well-educated graduates. Besides, many employers are also looking for various types of experience. Hence, a degree is no guarantee of a job, and should only be seen as reaching “first-base” in the recruitment process.

2. Why will there be a constant demand for particular jobs?

Nowadays the progress of technology is very high. So, as the IT industry is also high, there will be a constant demand for Network Systems Analysts, Data Communications Analysts and Computer Software Engineers. Also, the cyber security industry has made great strides recently with the war on cyber terrorism. Information Technology Specialists are of great demand too.

3. How do you see your career prospects?

As I am going to find a job of *an office manager*, I expect dealing with the following typical activities:

using a range of office software, including email, spreadsheets and databases;

managing filing systems;

depending on the organization, duties of the role may extend to the management of social media;

developing and implementing new administrative systems, such as record management;

recording office expenditure and managing the budget;

organizing the office layout and maintaining supplies of stationery and equipment;

maintaining the condition of the office and arranging for necessary repairs;

organizing and chairing meetings with my staff-in lower paid roles this may include typing the agenda and taking minutes, but senior managers usually have an administrative assistant to do this;

overseeing the recruitment of new staff, sometimes including training and induction;

- ensuring adequate staff levels to cover for absences and peaks in workload, often by using temping agencies;
- carrying out staff appraisals, managing performance and disciplining staff;
- delegating work to staff and managing their workload and output;
- promoting staff development and training;
- implementing and promoting equality and diversity policy;
- writing reports for senior management and delivering presentations;
- responding to customer enquiries and complaints;
- reviewing and updating health and safety policies and ensuring they are observed;
- arranging regular testing for electrical equipment and safety devices;
- attending conferences and training.

As I am going to find a job of a *chartered management accountant*, I expect dealing with the following typical activities:

- preparing periodic financial statements, including profit and loss accounts, budgets, cash flows, variance analysis and commentaries;
- providing a support service by working with all departments and the management team to help make financial decisions;
- ensuring spending is kept in line with the budget;
- informing key strategic decisions and formulating business strategies;
- advising on the financial implications and consequences of business decisions;
- analyzing financial performance and so contributing to medium and long-term business planning/forecasts;
- negotiating on major projects, loans and grants;
- offering professional judgement on financial matters and advising on ways of improving business performance;
- interpreting and communicating financial data to non-financial managers;
- liaising with other function managers to put the finances and accounts in context;
- monitoring and evaluating financial information systems and suggesting improvements where needed;
- implementing corporate governance procedures, risk management and internal controls.

As I am going to find a job of an *economist*, I expect dealing with the following typical activities:

- devising methods and procedures for obtaining data;
- understanding various sampling techniques that may be used to conduct different types of surveys;
- creating, as well as using, various econometric modelling techniques to develop forecasts;

- understanding and interpreting data;
- analyzing data to test the effectiveness of current policies, products or services and advising on the suitability of alternative courses of action and the allocation of scarce resources;
- explaining research methodology and justifying conclusions drawn from research data;
- providing economic advice to a range of stakeholders;
- evaluating past and present economic issues and trends;
- writing various technical and non-technical reports on economic trends and forecasts to inform the press and public;
- delivering numerous oral and visual presentations, which non-economist audiences must be able to understand thoroughly in order to inform decisions.

As I am going to find a job of *an automotive engineer*, I expect dealing with the following typical activities:

- designing and producing visual interpretations of automobiles and their components using computer-aided design packages;
- deciding on the most appropriate materials for component production;
- applying mechanical, thermodynamic, pneumatic, hydraulic and electrical principles to resolve engineering problems and find appropriate solutions;
- building prototypes of components, developing test procedures and conducting tests using software packages and physical testing methods;
- innovating, researching and developing new designs for components on automobiles and for manufacturing procedures, with consideration to changing customer needs and government emissions regulations;
- preparing material, cost and timing estimates, reports and design specifications;
- studying the energy, environmental and safety aspects of the planned work;
- supervising and inspecting the installation, modification and commissioning of mechanical systems in industrial facilities or plants;
- investigating mechanical failures or unexpected maintenance problems;
- supervising technicians, technologists and other engineers, and reviewing and approving designs, calculations and cost estimates;
- liaising with suppliers and handling supply chain management issues;
- taking responsibility for individual projects, managing associated budgets, production schedules and resources (including staff), and supervising quality control;
- inspecting and even test driving vehicles and checking for faults.

As I am going to find a job of *an electrical engineer*, I expect dealing with the following typical activities:

- identifying customer requirements;
- designing systems and products;

- reading design specifications and technical drawings;
- researching suitable solutions and estimating costs and timescales;
- making models and prototypes of products using three-dimensional design software;
- working to British (BS), European (EN) and other standards;
- liaising with others in the design team;
- liaising with clients and contractors;
- attending meetings on site;
- designing and conducting tests;
- recording, analyzing and interpreting test data;
- proposing modifications and retesting products;
- qualifying the final product or system;
- servicing and maintaining equipment;
- preparing product documentation, writing reports and giving presentations;
- monitoring a product in use to improve on future design.

As I am going to find a job of *a mechanical engineer*, I expect dealing with the following typical activities:

- designing and implementing cost-effective equipment modifications to help improve safety, reliability and throughput;
- developing a project specification with colleagues, often including those from other engineering disciplines;
- developing, testing and evaluating theoretical designs;
- discussing and solving complex problems with manufacturing departments, sub-contractors, suppliers and customers;
- making sure a product can be made again reliably and will perform consistently in specified operating environments;
- managing projects using engineering principles and techniques;
- planning and designing new production processes;
- producing details of specifications and outline designs;
- recommending modifications following prototype test results;
- using research, analytical, conceptual and planning skills, particularly mathematical modelling and computer-aided design;
- considering the implications of issues such as cost, safety and time constraints;
- working with other professionals, within and outside the engineering sector;
- monitoring and commissioning plant and systems.

As I am going to find a job of *a maintenance engineer*, I expect dealing with the following typical activities:

- designing maintenance strategies, procedures and methods;
- planning and scheduling planned and unplanned work;
- diagnosing breakdown problems;

carrying out quality inspections on jobs;
liaising with client departments and customers;
arranging specialist procurement of fixtures, fittings or components;
controlling maintenance tools, stores and equipment;
monitoring and controlling maintenance costs;
dealing with emergency and unplanned problems and repairs;
writing maintenance strategies to help with installation and commissioning guidelines.

4. How would you formulate your professional goal?

Career goals should be specific, measurable, achievable, realistic and timely. The main professional goal for me is to work hard over the next several years for getting higher position. Among additional goals I can mention the following:

- be known as an expert in a certain field or area;
- try to improve my presentation and speaking skills;
- learn how to say “no” politely at work;
- learn how to under-promise and over-deliver with clients or managers to surprise them;
- develop relationships with coworkers and clients to make work seem more enjoyable;
- become more creative;
- pick up and learn a new skill;
- set my eye on a specific award at work and go for it;
- partner up with another person to increase productivity;
- ask my boss for more responsibility or more clients at work;
- ask to be trained more for skills in a new department;
- double sales or productivity depending on my job;
- communicate more effectively at work;
- feel happier and more positive during my workday;
- develop more friendships at work and try to be less competitive;
- do things that will make me feel more energized at work.

5. How would you look for your ideal job?

I'll try to find answers to the following questions:
my interests, motivations and work-related values;
things I can do best of all;
the skills I got by my degree;
the factors that make up a job I'd love to do;
kind of lifestyle I want.

6. How would you prepare for the interview?

Before the interview I'll have plenty of time to:

research the role and the organization;

think about how well my experience, interests and skills fit the job and the organization;

research current affairs and trends in your job sector;

find out what the prospective employer is actually looking for;

anticipate questions I might be asked, then prepare answers to these questions;

find out what form the interview will take, e.g. single, panel, group etc.;

plan the day of the interview, especially your journey with an aim to arrive ten minutes early. Take money in case you need to take a taxi or bus unexpectedly; put the postcode of the organization into Google maps on your mobile to prevent getting lost;

decide what you will wear and set it out the night before. Suits and business clothes are the best option with comfortable, polished shoes;

get an early night – we all perform better when fully awake.

I'll think how to make a good impression at a job interview and stand out for all the right reasons by ensuring I:

arrive on time or better still early;

am organized – take my application letter, CV and examples of work (if appropriate) with me;

listen carefully to questions and answer them concisely;

highlight my best attributes in the interview. Before I go, I'll think about what I want the interviewer to know about me (in relation to the job) during the interviewing process;

pay attention to the way I communicate. There's evidence to suggest that non-verbal communication overpowers verbal communication so if I describe myself as confident and outgoing but speak inaudibly and avoid eye contact, the interviewer will read the latter as indicating a lack of confidence and disregard what I said about being confident;

practise anything I am concerned about. This could be saying my answers aloud, which builds confidence in hearing myself speak, or having a trial run of the journey to the interview.

In interviews, nerves can make one forget to do simple things such as smile and listen, which can result in being thought of as unfriendly or inattentive. So to control my nerves I should:

give myself time to think about what unique qualities I'll bring to the job / organization;

think of practical examples to demonstrate what I have achieved and draw upon all aspects of my working, educational and social life;

write notes and take these along to the interview;

use cues in my notes to highlight examples that I want to draw upon, such as “cricket team”, “course representative”, “sales job”;

be aware of the structure of the interview. Interviews often begin with topics that are easier to answer because one needs less time to think, such as “tell us about your studies at university”;

pause before answering a difficult question in order to give myself time to think;

use positive language, as interviewers will be assessing my motivation and enthusiasm;

ask for clarification if I am unsure of what the question means.

If I want to practise my interview skills, I can:

practise my answers (to anticipated questions) with someone I trust and seek feedback but don't be overly self-critical;

use non-job interviews as opportunities to practise and monitor my interview skills, e.g. discussions with my tutor, doctor etc.;

ask for feedback and advice after unsuccessful interviews and take it as an opportunity to learn and improve;

pay a private company to provide interview practice.

What should I take to a job interview?

often employers request examination certificates;

a pen and notebook are always worth carrying with me and, if giving a presentation, I'll take a copy on a data stick even if I have emailed it beforehand, along with copies of the slides to use as handouts for the interview panel;

if I take a mobile phone, I'll make sure it is switched to silent or off before entering the organization.

Phone interviews are most often used as a preliminary screen. When preparing for the interview it's important to consider:

tone of voice – I should be enthusiastic and use positive language;

battery life – if using my mobile, I'll charge it fully before the interview;

location – I'll think about finding a quiet place for the interview, where I will be undisturbed by noise or others.

Phone interviews are often recorded so I may find out whether mine will be. It's important to pay particular attention to getting my key messages across quickly – write key attributes down and have this available during the phone call.

Skype or video interviews are popular nowadays especially if applying for jobs overseas or where key staffs are located overseas. In this case I'll remember to dress as I would for a face-to-face interview and check what else will be in the shot with me before the interview begins.

The second interview means I have made it through the initial screening and the interviewer is now looking for:

evidence that I have the skills, abilities and interest to carry out the job;
confirmation that I am able to bring something of value to the organization;
challenges that face the organization, its priorities, its markets, its competitors, any existing or new legislative arrangements, etc.;

I'll think about what I could bring to the organization and prepare examples of how I have achieved (or learned) something of relevance.

7. How would you advertise your competitive advantages?

A competitive advantage is what you are better at doing than anyone else, or in other words how you manage to stay in business against the competition. The smarter you can be about developing and promoting your competitive advantage, the better placed your business will be to succeed. There are three basic ways to establish a competitive advantage: your advantage lies in being the cheapest, servicing a particular market better than anyone else, being different from the others.

8. The climate of the Earth has been changing too rapidly. What are the reasons for it?

Changes in the Earth's orbit

The Earth's orbit around the Sun is an ellipse, not a circle but the ellipse changes shape. When the Earth is closer to the sun our climate is warmer.

Quantity of greenhouse gases in the atmosphere

Higher concentrations of carbon dioxide and other greenhouse gases in the atmosphere cause Earth to warm. Warmer temperatures increase the amount of water vapor in the atmosphere. As water vapor is a greenhouse gas, this leads to even further warming.

Carbon dioxide content of the oceans

The oceans contain more carbon dioxide (CO₂) than the atmosphere and they can also absorb CO₂ from the atmosphere. When the CO₂ is in the oceans, it does not trap heat as it does when it is in the atmosphere. If CO₂ leaves the oceans and moves back into the atmosphere, this can contribute towards a warmer climate.

Plate tectonics

Over time, plate tectonic processes cause continents to move to different positions on the globe. The movement of the plates also causes formation of volcanoes and mountains, and these too can contribute to a change in climate.

Ocean currents

Ocean currents carry heat around the Earth. The direction of these currents can shift so that different areas become warmer and cooler. Oceans store a large

amount of heat, so that small changes in ocean currents can have a large effect on coastal and global climate.

Vegetation coverage on the land

On a global scale, patterns of vegetation and climate are closely correlated. Vegetation absorbs carbon dioxide and this can buffer some of the effects of global warming.

9. Has technology made our lives better or worse? Prove it.

Technology is making some aspects of life easier – we don't have to walk everywhere, we can have dinner ready in two minutes, we don't even have to go out to buy the groceries and we don't have to buy books to have something to do on a rainy day.

However, this also means people are getting unfit, less social and more frustrated. People rely on cars to travel small distances and don't do any exercise, they don't spend time developing cooking skills, thus, don't enjoy what has the potential to be an enjoyable activity, don't get to choose the best of the food and often then don't eat healthy food, people spend the day isolated in front of computers, game cubes, play stations, TV sets, wrecking social life and eyes.

Besides, technology is also ruining our environment because of the greenhouse gases and other wastes released through the use of electronics.

10. Life one hundred years ago was much more stressful than it is today. How true do you think this is? Life nowadays is generally much more stressful than in the past. Give some reasons why people suffer more from stress nowadays, and say what they can do to reduce it.

Nowadays, people do many activities during the day to earn much money and provide a standard happy family life. It could produce stress.

Stress is a factor in everyone's life, particularly during major events such as marriage, divorce, starting a new job, traffic jams or buying a house. But many of the most stressful events are related to the workplace: firings, business readjustments, changes in financial status, altered responsibilities, a switch to a different line of work, trouble with the boss, variations in work hours or conditions, retirement and vacations.

These days, the problem comes with having more stress in our lives than we need. Although stress affects health, relationships, career and overall quality of life, many people aren't conscious of the impact it is having on them. Our

body's stress reactions can become problematic when they're too strong or happen too often.

People do not have much time to relax. For reducing stress – travelling in the weekends could be the best solution to refresh. In addition, people could spend a more time with family to enjoy how beautiful life is.

11. Are there any consumer protection laws in your country?

The Law of Ukraine on Consumer Rights Protection entered into force on October 1, 1991. The Law regulates relations between a consumer of goods (works, services) and their producers, sellers, performers of different ownership forms.

12. What is your opinion of credit cards and other systems that replace cash?

Cards compete with cash when we pay directly at the point of sale, for example in supermarkets, petrol stations, restaurants or at cinemas. It is the customers who choose how they want to pay.

I think paying in cash is quick and easy for small sums. It appears that cash imparts a sense of security. Appropriate substitutes for cash are not always available. Although cards are accepted almost everywhere, there are few alternatives when it comes to payments between private individuals, for example on the Internet. Cash is one way of storing a value and it is often wise to maintain a certain liquidity reserve in the form of cash.

13. The British say “There are book-readers, book-lovers and book-worms”. Who do you belong to?

I belong to book-readers. I live for books. There is absolutely no difference between a hardcover book or an audio-book or a multimedia book application. The biggest pleasure comes from what I read.

I belong to book-lovers. I read books because I love them, not because I think I should read them. A book-lover is someone who loves and usually collects books.

I belong to book-worms. I love reading so much, even forget eating and sleeping, read every book, no matter what subjects it is about. A book-worm is someone who loves books for their content, or who otherwise loves reading.

14. What makes students successful in their studies?

Successful students exhibit a combination of successful attitudes and behaviors as well as intellectual capacity. Successful students:

- are responsible and active;
- have educational goals;
- ask questions;
- learn that a student and a professor make a team;
- don't sit in the back;
- take good notes;
- understand that actions affect learning;
- talk about what they're learning;
- don't cram for exams;
- are good time managers – you will either control time or be controlled by it!

15. What causes unemployment? Is it a burning problem in your country?

Unemployment is caused when someone is laid off, fired or quits – and is still looking for a job. This type of natural unemployment always occurs, even in a healthy economy. If someone retires or leaves the work to take care of children or other family member, that is not unemployment.

Sometimes unemployment is a result of advanced technology, such as computers or robots, which replaces worker tasks with machines. If the workers are not retrained, they may not have the skills needed to get a new job. This is known as structural unemployment.

Unemployment can also be caused by job outsourcing, when a company moves its manufacturing or call centers to another country where labor costs are cheaper.

Large scale unemployment is caused when consumer demand slows enough that businesses lose too much profit. If they don't expect sales to pick up anytime soon, they then must lay off workers. This usually happens during the recession phase of the business cycle.

This problem is especially burning among the socially unprotected segment of the population, the youth. Thus, the state guarantees the right of young people to work, but due to lack of sufficient practical experience, social, legal and professional knowledge, and, sometimes, psychological inability to successfully compete in the labor market, it is difficult for young citizens to exercise their legal right to work.

16. Every year more and more people are out of work. What is the solution to this problem?

The world economy is now more interconnected than ever. Financial markets are heavily regulated while capital markets are expanding in Asia,

Africa and Latin America. The banking sector is going through a concentration process with fewer and fewer players left. Europe seems to be back in the game, with Germany leading the recovery of the continent. Economies all over Europe are either showing no growth. The US is still the world's most competitive economy. Interest rates and government bond yields are at historical lows and stock markets have recovered to pre-crisis levels. It looks like "now is the time to prepare" for the next crisis.

Energy crisis

The development of techniques and growing supply of gas in the US have turned shale gas into a potent geopolitical weapon. If the US Congress were to allow energy exports, energy prices in the world would fall significantly.

Geopolitical crisis

From Nigeria to Ukraine, and from Syria to Venezuela, the world risk map shows too many hot areas where geopolitical events could trigger a world crisis. Why should anyone care about Ukraine or Syria? Because financial markets tend to overreact to political events.

Poverty crisis

Over the last few decades the world has become richer and more prosperous. While the percentage of the population in absolute poverty is today at its lowest level ever, the absolute number of poor people continues to grow. In this context income inequality is one of the social battles that we need to fight. But the problem with fighting income inequality is that the usual solutions (typically taxes) hinder the competitiveness of nations. This is one of the long-term crises that will require smart leadership to avoid inefficient solutions.

Cash crisis

There is too much money out there. It is the result of quantitative easing policies that central banks have followed.

War crisis

There could not be any stability in the world if wars still continue.

Politicians and corporate executives should now look to diversify, to seek varied geographical presence, to be flexible and to manage risk. They should cultivate and reward talent and improve their credibility in society. In order to avert the next crisis and others after that, global leaders should be making employment, sustainability and social cohesion the top priorities of their nations.

17. Describe the qualifications and personal characteristics that would be necessary for the job you have chosen.

If I have a job of a *project manager*, I'll need the following skills and abilities:

leadership: an experienced team leader;

influencing, leading, and delegating abilities;
ability to initiate/manage cross-functional teams and multi-disciplinary projects;
critical thinking, decision making and problem solving skills;
planning and organizing – organizational abilities;
result oriented: ability to achieve the target within given time;
excellence communication skills;
negotiating skills;
conflict resolution;
adaptability – efficient under pressure, always meet deadlines.

If I have a job of *a mechanical engineer*, I'll need the following skills and abilities:

determine the causes of technical problems and find solutions for them;
determine the tools and equipment needed to do a job;
analyze needs and requirements when designing products;
repair machines or systems;
test and inspect products, services, or processes. Evaluate quality or performance;
design equipment and technology to meet user needs;
watch gauges, dials, and output to make sure a machine is working properly;
maintain equipment on a routine basis. Determine when and what kind of maintenance is needed;
operate and control equipment;
install equipment, machines, wiring or programs to meet specifications.

18. Do you believe “One works to live” or “One lives to work”? Give your arguments for and against.

If one works to live, one has something worth working for. If one lives to work, hopefully one does not get fired. It means that one must find work that is worth doing that resonates with the deepest part of you, where you find purpose and meaning, so that there is no boundary between living and working. Work is not something you should do just to survive, but really to live and live out your meaning.

19. Say what the role of science in your everyday life is.

Science plays an important role in our daily life. It has made our life easier, safer, faster and more comfortable.

Scientific inventions – different engines, the law of gravity, electricity, computers.

Means of communication – buses, cars, trains, ships and planes are the greatest contribution of science. Man can reach any part of the world within hours.

Medicine and surgery – antibiotics and vaccines protect people from diseases that were once feared as deadly, such as measles or syphilis.

Atomic energy – man has got an inexhaustible source of energy. It can meet the demands of energy of the world for a long time.

20. Describe what you like/dislike about using a computer.

While using a computer *I like*:

staying in touch with or making new friends very easily with people;
getting all my news off the internet. If I had to go a whole day without using the internet, I would have no idea what is going on in the world;

using computer for organization, learning, communicating, managing accounts, working, just about everything I need to make my life easier;

As to dislikes, I can mention the following:

computers are hard to navigate sometimes;

they are slow sometimes;

you can easily mess them up if you don't know what you're doing;

some people might have arthritis in their hands and don't like to type because it irritates their hands;

bright light from the screen might irritate people's eyes sometimes;

they might not like certain websites.

QUIZ 1
ALL ABOUT WELDING

1. There are three basic types of welding. One type is called “TIG” welding. What does the abbreviation “TIG” represent?
 - A. *Tungsten Inert Gas*
 - B. *Tungsten In Gas*
 - C. *Turned Inside Gas*
 - D. *Totally Irrelevant Garbage*

2. Another type of welding is called “MIG” welding. MIG stands for:
 - A. *Mainly in Gas*
 - B. *Metal Inert Gas*
 - C. *Metal in Gas*
 - D. *Measured in Gas*

3. During the process of welding a deposit of metal is left on the material. What is this deposit called?
 - A. *A Crater*
 - B. *A Puddle*
 - C. *A Bead*
 - D. *A Deposit*

4. Another type of welding is called “Stick” welding. This welding process uses a flux covered electrode to produce the weld. What is the holder that holds the electrode known as?

- A. *The stinger*
- B. *The rod holder*
- C. *The handle*
- D. *The rod clamp*

5. Welders use electrical currents to produce the power that welds the metal together. A.C. and D.C are two types of welding currents. What do these terms represent?

- A. *Alternating Current and Direct Current*
- B. *After Crushing and Done Crushing*
- C. *Alter Current and Dominating Current*
- D. *Attracting Current and Detracting Current*

6. The process of electric welding produces a brilliant light that will burn the eyes if not protected. What do welders use to protect their eyes?

- A. *Sunglasses*
- B. *Cutting goggles*
- C. *A special hood*
- D. *A welding helmet*

7. The electrodes that are used with arc welders are numbered. e.g. 7018 – 1/8. What do the numbers represent?

- A. *Diameter, length , strength and type of covering*
- B. *Position, diameter, strength and length*
- C. *Length, type of covering, strength and position*
- D. *Strength, position, type of covering and diameter*

8. To become a journeyman welder, you have to know the structure of metal. What is the term used to describe the study of metal?

- A. *The knowledge of metal*
- B. *Metal knowledge*
- C. *Metallography*
- D. *Metal know-how*

9. Stainless steel and mild steel cannot be welded using the same procedure. What common method is used to differentiate between the two?

- A. *A scriber*

- B. A pen*
- C. A magnet*
- D. A flashlight*

10. MIG welders use wire that is rolled on a reel. The welder pushes the wire through a liner and out the end of a gun. Which of these are not a type of MIG gun?

- A. Shotgun*
- B. Spool gun*
- C. Push/pull gun*
- D. Whip gun*

QUIZ 2

ALL ABOUT MIG WELDING

1. In the GMAW process, what is the primary source of oxidizers and alloying elements that contribute to the purity and mechanical properties of the weld metal?

- A. The wire*
- B. The shielding gas*
- C. The mode of transfer*
- D. The weld parameters*

2. What is the purpose of copper coating on MIG wires?

- A. To prevent rust*
- B. To increase contact tip life*
- C. To assure good electrical conductivity*
- D. All the above*

3. What elements are most commonly added to GMAW wires as oxidizers?

- A. Molybdenum and Copper*
- B. Nickel and Molybdenum*
- C. Manganese and Silicon*
- D. Silicon and Chromium*

4. Rust is a source of:

- A. *Silicon*
- B. *Oxygen*
- C. *Manganese*
- D. *Nickel*

5. In GMAW, using 100% CO₂ shielding gas produces:

- A. *Less spatter and concave welds*
- B. *More spatter and convex welds*
- C. *More spatter and flatter welds*
- D. *Less spatter and convex welds*

6. What type of power supply is commonly used for general GMAW welding?

- A. *Constant Current*
- B. *Constant Voltage*
- C. *Pulse*
- D. *Syncrowave*

7. As the percentage of CO₂ in the shielding gas increases, the amount of alloy recovered in the weld metal:

- A. *Increases*
- B. *Decreases*
- C. *Stays the same*
- D. *Vanishes*

8. What does the “D” indicate on a wire classified as an ER 80S-D2?

- A. *Down-hand use only*
- B. *0.5 % Molybdenum*
- C. *No preheating required*
- D. *1 % Molybdenum*

9. What limitation exists for use of GMAW-Spray transfer?

- A. *Position of welding*
- B. *Polarity*

- C. Mechanical Properties*
- D. Higher Diffusible Hydrogen*

10. Cold Lap can occur with:

- A. Short circuit transfer*
- B. Globular transfer*
- C. Spray transfer*
- D. All of the above*

11. For Globular transfer in GMAW, what shielding gas is used?

- A. 75 % Argon, 25 % CO₂*
- B. 100 % CO₂*
- C. 92 % Argon, 8 % CO₂*
- D. 85 % Argon, 15 % CO₂*

12. What is the major reason for using a Modified Spray?

- A. Increased travel speed*
- B. Higher Deposition efficiency*
- C. Uses less shielding gas*
- D. Better mechanical properties*

13. Generally, what is the minimum Argon percentage required to achieve a “true” spray transfer?

- A. 75 %*
- B. 70 %*
- C. 80 %*
- D. 90 %*

14. What is the major advantage of GMAW over SMAW?

- A. Higher Deposition*
- B. Simplicity of equipment*
- C. Portability*
- D. Versatility*

15. What limits the short circuit current?

- A. Inductance*
- B. Slope*

- C. Wire Feed Speed*
- D. Voltage*

QUIZ 3 WELDING

1. Fuel cylinders must be stored at least feet from combustibles.
 - a) 20*
 - b) 45*

2. Shielding is a process used to protect the eyes from welding fume.
 - a) True*
 - b) False*

3. Three physical welding hazards are radiation, infrared radiation, and intense visible light.
 - a) X-ray*
 - b) ultraviolet*

4. You should not use oxygen as a substitute for air.
 - a) True*
 - b) False*

5. As long as they are secure, fuel cylinders can be stored on their side.
 - a) True*
 - b) False*

6. Gas metal arc welding is also known as welding.

- a) *TIG*
- b) *MIG*

7. Exposure to zinc fumes may cause metal fume fever.

- a) *True*
- b) *False*

8. Cylinder inspection requirements are regulated by the Department of

- a) *Department of Environment*
- b) *Department of Transportation*

9. Acetylene has a very narrow flammable range.

- a) *True*
- b) *False*

10. Backflow prevention should be provided for oxygen cylinders.

- a) *True*
- b) *False*

APPENDIX WELDING PROCESSES AND LETTER DESIGNATION

Arc welding Carbon Arc	CAW
Brazing Diffusion Brazing	DFB
Cold Welding	CW
Diffusion Welding	DFW
Dip Brazing	DB
Dip Soldering	DS
Electroslag	ESW
Explosion Welding	EXW
Flash Welding	FW
Flux Cored Arc	FCAW
Forge Welding	FOW
Friction Welding	FRW
Furnace Brazing	FB
Furnace Soldering	FS
Gas Metal Arc	GMAW
Gas Tungsten Arc	GTAW
Group Welding Process	Letter Designation
High Frequency Resistance	HFRW
Hot Pressure Welding	HPW
Induction	IW

Induction Brazing	IB
Induction Soldering	IS
Infrared Brazing	IRB
Infrared Soldering	IRS
Iron Soldering	INS
Laser Beam	LBW
Oxyacetylene Welding	OAW
Oxyhydrogen Welding	OHW
Percussion Welding	PEW
Plasma Arc	PAW
Pressure Gas Welding	PGW
Projection Welding	RPW
Resistance Brazing	RB
Resistance Soldering	RS
Resistance-Seam Welding	RSEW
Resistance-Spot Welding	RSW
Roll Welding	ROW
Shielded Metal Arc	SMAW
Stud Arc	SW
Submerged Arc	SAW
Thermit	TW
Torch Brazing	TB
Torch Soldering	TS
Ultrasonic Welding	USW
Upset Welding	UW
Wave Soldering	WS
Welding Processes Electron Beam	EBW

GLOSSARY

Academic economists engage in teaching, writing and doing research.

Government economists collect and analyze information about economic conditions in the nation and possible changes in government economic policies.

Business economists work for banks, insurance companies, investment companies, manufacturing firms, economic research firms, and management consulting firms.

Entrepreneurs operate their own economic businesses.

Bachelor of Art (BA) or Bachelor of Science (BS) is a person who holds a first university degree.

Master of Art (MA) or Master of Science (MS) is a holder of the second university degree.

Doctorate is the highest university degree.

Economic means concerned with the organization of the money, industry, and trade of a country, region, or social group.

Foreign trade – exchange of goods and services between countries.

Goods – when used without an adjective modifier (like “final” goods or “intermediate” goods), this generically means physical, tangible products used to satisfy people’s wants and needs.

Interest – payments for the use of borrowed funds.

Job – specific employment activities associated with a production process that are usually undertaken by a single worker. For example, someone might have the job of serving food or repairing cars. Others might have the job of teaching economics. The word “job” is the primary designation applied to a worker when hired by an employer. It is commonly used as a modifier for other terms, such as job satisfaction or job security, as reference to specific aspects of working or employment.

Keynesian economics – a school of thought developed by John Maynard Keynes built on the proposition that aggregate demand is the primary source of business cycle instability, especially recessions. The basic structure of Keynesian economics was initially presented in Keynes’ book “The General Theory of Employment, Interest and Money”, published in 1936.

Labor market – a market that exchanges the services of labor resources.

Money characteristics – almost any item, any asset, any “thing” can function as money so long as it is generally accepted as payment.

Natural resources – the naturally occurring resources that are naturally a part of our natural planet which are directed toward production – including land, water, wildlife, vegetation, air, climate, sunshine, mineral deposits, and soil nutrients.

Ownership means that you have legal “title” to a resource, good, or commodity.

Profit is the difference between revenue and cost.

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