Контрольна робота 100

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

WHAT IS AN ACID OR A BASE?

By the 1884 definition of Svante Arrhenius (Sweden), an acid is a material that can release a proton or hydrogen ion (H^+). Hydrogen chloride in water solution ionizes and becomes hydrogen ions and chloride ions. If that is the case, a base, or alkali, is a material that can donate a hydroxide ion (OH^-). Sodium hydroxide in water solution becomes sodium ions and hydroxide ions. By the definition of both Thomas Lowry (England) and J.N. Brшnsted (Denmark) working independently in 1923, an acid is a material that donates a proton and a base is a material that can accept a proton. Was Arrhenius erroneous? $| 8-) No. The Arrhenius definition serves well for a limited use. We are going to use the Arrhenius definitions most of the time. The Lowry-Brшnsted definition is broader, including some ideas that might not initially seem to be acid and base types of interaction. Every ion dissociation that involves a hydrogen or hydroxide ion could be considered an acid- base reaction. Just as with the Arrhenius definition, all the familiar materials we call acids are also acids in the Lowry - Brшnsted model. The G.N. Lewis (1923) idea of acids and bases is broader than the Lowry - Brшnsted model. The Lewis definitions are: Acids are electron pair acceptors and bases are electron pair donors.

We can consider the same idea in the Lowry - Brшnsted fashion. Each ionizable pair has a proton donor and a proton acceptor. Acids are paired with bases. One can accept a proton and the other can donate a proton. Each acid has a proton available (an ionizable hydrogen) and another part, called the *conjugate base*. (That word, 'conjugate' just means that it "goes with" the other part.) When the acid ionizes, the hydrogen ion is the acid and the rest of the original acid is the conjugate base. Nitric acid, HNO_3, *dissociates* (splits) into a hydrogen ion and a nitrate ion. The hydrogen almost immediately joins to a water molecule to make a hydronium ion. The nitrate ion is the conjugate base of the hydrogen ion. In the second part of the reaction, water is a base (because it can accept a proton) and the hydronium ion is its conjugate acid.

$$HNO_3 + H_2O \longrightarrow (NO_3)^- + (H_3O)^+$$

ACID BASE CONJUGATE BASE CONJUGATE ACID

Chemists or chemistry texts often use the hydrogen ion, H^+ to show a hydrogen ion released into water solution. In a way, there is no such thing as a hydrogen ion or proton without anything else. The majority of hydrogen atoms are only a single proton and a single electron. If you remove the electron to make it an ion, the only thing that is left is a proton. Protons just don't exist naked like that in water solution. Remember that water is a very polar material. There is a strong partial negative charge on the side of the oxygen atom and a strong partial positive charge on the hydrogen side. Any loose hydrogen ion, having a positive charge, would quickly find itself near the oxygen of a water molecule. At close range from the charge attraction, the hydrogen ion would find a pair (its choice of two pairs) of unshared electrons around the oxygen that would be capable of filling the its outer shell. Each hydrogen ion unites with a water molecule to produce a *hydronium ion*, $(H_3O)^+$, the real species that acts as acid. The hydroxide ion in solution does not combine with a water molecule in any similar fashion. As we write reactions of acids and bases, it is usually most convenient to ignore the hydronium ion in favor of writing just a hydrogen ion, H^+.

II. Read and translate the text

Alternative Medicine

The practices associated with the term “alternative medicine” represent a wide variety of approaches to health, the human body and the world. The therapies that fall under the rubric of

alternative medicine can be divided into six areas: diagnostics; physical therapies or bodywork; natural healing; stimulation; detoxification; and stress management.

Diagnostics. Several alternative diagnostic methods, based on foundations of Eastern religions and philosophies, have a basis in scientific medical research. These include examination around the body; examination of the abdomen; observation of skin colour and quality of posture and movement; examination of the tongue; listening to the quality of voice and bodily sounds; detailed questioning about habits and family history; examination of the patient's sensory experiences.

Physical therapies or bodywork involve manipulation of the body through movement, massage, stretching, or correction of posture and movement. ***Chiropractic therapy*** involves manipulation of the spinal column. Many of the principles on which contemporary chiropractic therapy is based were developed as part of the Chinese healing arts in the 3rd century BC. Many cultures have documents as to the use of similar techniques, such as massage, adjustment, and back-walking, as part of traditional healing therapies. Manipulation consists of the adjustment of segments of the spine using a number of techniques to alleviate tension, swelling, and pain. Often the practitioner will apply short and rapid, twisting movements into the spinal cord in order to realign the vertebrae. ***Osteopathy*** corrects the musculoskeletal dysfunction in order to enable the body to heal itself. By manipulating the muscles, joints, and ligaments through a series of manual techniques, the osteopath attempts to return the body to a natural state of alignment. Diet and lifestyle changes may also be recommended.

Natural healing involves the use of substances from the "natural" world. More than half of ***homeopathic medicines*** are derived from plants. Salts and metals comprise most mineral remedies. Animal venoms, secretions, insects, musk, and squid ink are in many remedies. All substances are harvested in their natural or purest state and diluted by straining with alcohol or by grinding with lactose, then combined with sugar from cow's milk and cast into tablets of a texture that dictates their delivery into the body. The danger of homeopathic medicine is in worsening a person's symptoms or muddling them, further obscuring the underlying cause. ***Aromatherapy*** uses aromatic herbal oils, inhaled or applied topically by massage. Essential oils are used for a number of purposes, including the alleviation of stress, the relief of pain, the prevention of disease and infection, and the induction of sleep.

Stimulation denotes therapies that attempt to stimulate the defense and healing mechanisms of the body. This includes acupuncture and acupressure, important methods in Chinese medicine that have been used for anaesthesia, treatment of back pain, spasms, and headaches, and controlling addictions. ***Acupuncture*** involves the introduction of thin needles into the body. Acupuncture has been used to treat ailments as diverse as allergies, skin rashes, gastrointestinal disorders, muscular pains, and emotional and psychiatric disorders; it has often been applied as a way of controlling pain. ***Acupressure*** involves external pressure on critical points. This technique has been used in the treatment of headaches, back pain, muscle pain and spasms, insomnia, gastrointestinal and gynaecological problems. Pregnant women should be aware that some acupressure techniques have been known to cause premature contractions.

Detoxification focuses on ridding the body of toxins and disease-causing agents. These include: ***chelation therapy***, in which a chemical solution is introduced intravenously; ***colon therapy***, in which enemas are used to cleanse the large intestines; ***fasting***: which is voluntarily not eating food for varying length of time used to detoxify the body; and ***hydrotherapy*** which

uses immersion and steam baths. Some methods of detoxification can be dangerous and should not be used as a substitute for needed medical attention.

Stress management. Therapies devoted to stress reduction include meditation, and movement therapies, such as qigong, yoga, and t'ai chi chuan. ***Qigong*** is a combination of visualization, breathing, and gentle movements designed to stimulate the flow of "qi". In ancient Chinese medicine, qi is the elemental life force. Disease is caused by a malfunction in the flow of qi, and qigong attempts to improve the flow of qi and thus maintains health and treats disease. ***Yoga*** is a combination of physical and spiritual exercises to promote relaxation, flexibility, and health. The foundation of yoga is found in a collection of Indian scriptures, the ***Upanishads***, dating back to the 2nd century BC. These postures are practised as part of an overall system of health in which enlightenment is the primary aim. The combination of yoga postures practised with controlled breathing and meditation has proven an effective means of combining a number of physical ailments.

III. Fill in the gaps with the words from the table. Read and translate the sentences.

brain	***techniques***	***over-the-counter***	***impulses***	***needles***
manipulation	***disorders***	***individual***	***natural rhythm***	***hydrotherapy***

1. In acupuncture treatment, the acupuncturist inserts thin _____ at specific points in the body.
2. Pain is a message sent by the body to the _____, signaling that disease or injury has caused trouble in some area.
3. Chiropractors believe that if the spinal vertebrae are properly aligned, _____ from the brain are able to travel freely along the spinal cord to various organs.
4. Massage, which falls under the category of bodywork, involves _____ of muscles and other soft tissues.
5. Hypnotherapy is a method by which a qualified physician or therapist can induce positive mental state in an _____.
6. Several_____ medications are available to help an individual to control his/her pain.
7. A variety of relaxation _____ are available, including deep breathing, meditation, progressive relaxation, and yoga.
8. _____ includes baths, whole body and specific body part compresses, showers, stembaths, etc.
9. The use of natural sunlight and various forms of light therapy has been effective in reestablishing the body's _____.
10. Music therapy is the controlled use of music in the treatment of physical, mental, or emotional _____.

IV. Fill in the gaps with the appropriate prepositions. Read and translate the sentences.

1. Like meditation and visualization, hypnotherapy is a method ___ which a qualified physician can induce a positive mental state ___ an individual.
2. Hypnosis is designed to generate a state ___ deep relaxation ___ which there is a heightened receptivity to suggestion ___ the calm repetition ___ words and statements.
3. Once an individual is ___ this state, the practitioner provides simple verbal suggestions that help the mind block the awareness ___ pain and replace it ___ a more positive feeling, such as a feeling of warmth.
4. Hypnotherapy helps to reduce anxiety, and induces a deep level ___ relaxation.
5. ___ a hypnotic state, the mind is highly focused and fully aware ___ the situation.
6. No one can be forced ___ hypnosis.
7. The client must be a willing participant ___ the process.

8. Good rapport ___ therapist and client is important.
9. ____ hypnosis, breathing and pulse rate slow down and blood pressure may drop.

V. Make up as many questions as possible to the following sentences.

1. There are more than 100 systems of alternative medicines still in practice all over the world.
2. The therapies of alternative medicine can be divided into six areas.
3. Chiropractic therapy was developed as part of the Chinese healing arts in the 3rd century.
4. Acupressure involves external pressure on critical points of the body.
5. The National Health Interview Survey (NHIS) showed that approximately 38 per cent of adults in the USA use alternative medicine.
6. People use meditation to increase calmness and relaxation, improve psychological balance, cope with illness, or enhance overall health.
7. **Yoga** typically combines physical postures, breathing techniques, and meditation or relaxation.
8. Acupuncture is among the oldest healing practices in the world.
9. Aromatherapy is a term developed in the 1920s to describe the practice of using essential oils taken from plants in healing.
10. Classical homeopathy originated in the 19th century as an alternative to the standard medical practices of that day, such as phlebotomy or bloodletting.

    Alternative therapies focus on healing the cause of the disease and address not just to the physical body but also to the patient's spiritual and emotional health.

Контрольна робота 101

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

PROPERTIES OF ACIDS

For the properties of acids and bases we will use the Arrhenius definitions.

Acids release a hydrogen ion into water (aqueous) solution. You will usually see the formula for an acid with the ionizable hydrogen at the beginning, such as HCl, hydrochloric acid, or $H(C_2H_3O_2)$, acetic acid.

Acids neutralize bases in a neutralization reaction. An acid and a base combine to make a *salt* and water. A salt is any ionic compound that could be made with the anion of an acid and the cation of a base. The hydrogen ion of the acid and the hydroxide ion of the base unite to form water.

Acids corrode active metals. Even gold, the least active metal, is attacked by an acid, a mixture of acids called 'aqua regia,' or 'royal liquid.' When an acid reacts with a metal, it produces a compound with the cation of the metal and the anion of the acid and hydrogen gas.

Acids turn blue litmus to red. Litmus is one of a large number of organic compounds that change colors when a solution changes acidity at a particular point. Litmus is the oldest known pH indicator. It is red in acid and blue in base. The phrase, 'litmus test,' indicates that litmus has been around a long time in the English language. Litmus does not change color exactly at the neutral point between acid and base, but very close to it. Litmus is often impregnated onto paper to make 'litmus paper.'

Acids taste sour. TASTING LAB ACIDS IS NOT PERMITTED BY ANY SCHOOL. The word 'sauer' in German means acid and is pronounced almost exactly the same way as 'sour' in English. (Sauerkraut is sour cabbage, cabbage preserved in its own fermented lactic acid. http://en.wikipedia.org/wiki/Sauerkraut http://www.wildfermentation.com/resources.php?page=sauerkraut) Stomach acid is hydrochloric acid. Although tasting stomach acid is not pleasant, it has the sour taste of acid. Acetic acid is the acid ingredient in vinegar. Citrus fruits such as lemons, grapefruit, oranges, and limes have citric acid in the juice. Sour milk, sour cream, yogurt, kimchi, and cottage cheese have lactic acid from the fermentation of the sugar lactose.

PROPERTIES OF BASES

Bases release a hydroxide ion into water solution. (Or, in the Lowry - Brшnsted model, cause a hydroxide ion to be released into water solution by accepting a hydrogen ion in water.)

Bases neutralize acids in a neutralization reaction. The word - reaction is: Acid plus base makes water plus a salt.

Where 'Y' is the anion of acid 'HY,' and 'X' is the cation of base 'XOH,' and 'XY' is the salt in the product, the reaction is: $HY + XOH \longrightarrow HOH + XY$

Bases denature protein. This accounts for the "slippery" feeling on hands when exposed to base. Strong bases that dissolve in water well, such as sodium or potassium lye are very dangerous because a great amount of the structural material of human beings is made of protein. Serious damage to flesh can be avoided by careful use of strong bases.

Bases turn red litmus to blue. This is not to say that litmus is the only acid - base indicator, but that it is likely the oldest one.

Bases taste bitter. There are very few food materials that are alkaline, but those that are taste bitter. It is even more important that care be taken in tasting bases. Again, NO SCHOOL PERMITS TASTING OF LAB CHEMICALS. Tasting of bases is more dangerous than tasting acids due to the property of stronger bases to denature protein.

II. State the morphological composition of the following nouns.

Relaxation, immersion, flexibility, contraction, disorder, delivery, massage, ligament, quality, practice, correction, texture, visualization.

III. Complete the table with missing forms.

Verb	Noun	Adjective
	breath	
to associate		
		similar
		pregnant
to devote		
		dilute
	flexibility	
to improve		
		dangerous
to apply		
	promotion	
	inhalation	

IV. Make up questions to the underlined words.

1. Osteopathy corrects the musculoskeletal dysfunction.
2. Acupuncture and acupressure were used in Chinese medicine for anaethesia.
3. Qigoing is designed to stimulate the flow of "qi".
4. In ancient Chinese medicine, qi is the elemental life force.
5. The danger of homeopathic medicine is in worsening a person's symptoms or muddling them.
6. The term "alternative medicine" is used to describe healing treatments that are not a part of conventional medical training.
7. Until recently, most Western hospitals didn't provide any alternative treatments.
8. Alternative medicine therapies don't rely on surgery or conventional medications.
9. People often turn to alternative medicine when they have a long-lasting problem that conventional medicine hasn't completely cured**.**
10. Healthy people often use alternative medicine to try to prevent illness or to ensure a healthier lifestyle.

V. Translate the following sentences into English.

1. Яке визначення можна дати терміну "альтернативна медицина"?
2. Альтернативну медицину можна поділити на 6 основних галузей, чи не так?
3. Альтернативна медицина зосереджує увагу на цілому організмі чи лише на хворому органі?
4. Які галузі включає в себе альтернативна медицина?
5. Альтернативну медицину не вважають частиною традиційної медицини, чи не так?
6. Акупунктура передбачає вколювання тонких голок у певні частини тіла, чи не так?
7. Ефірні масла є основними компонентами аромотерапії, чи не так?
8. Чи є альтернативна медицина безпечнішою за традиційну?
9. Чи є рослинні препарати кращими, аніж синтетичні ліки?
10. Альтернативна медицина здатна чи не здатна вилікувати серйозні захворювання та травми?
11. Термін "акупунктура" походить з Китаю, чи не так?
12. Де спочатку використовувались методи альтернативної медицини?

13. Скільки часу використовується альтернативна медицина у західній медицині?
14. Коли вперше люди почали звертатися до альтернативних засобів лікування?

VI. Read and translate the following text. Express your own opinion on whether it is worth using alternative medicine or a person should stick to traditional methods of treatment.

Alternative Medicine – Kill or Cure

Isn't it weird how the world changes? Even when it comes to medicine, fashion has changed down through the ages. For example, in Henry VIII's day, if anyone got sick, including the so-called upper class, medical men would come bearing jars of leeches. Leeches? Yes, the hungry little suckers would be attached to the human body and left to suck away until they were plump with blood. It was thought that by bleeding the poor patient, it would suck out whatever was ailing the poor thing. Even high blood pressure was thought to be caused by there being "too much blood" in the body and a vein was promptly opened to let out the excess! Of course, this left the patient too weak to fight off whatever was ailing him in the first place and they often died of blood poisoning occasioned by the cut.

In the dark ages, all medicines, including natural remedies, were banned because the church decreed that sickness was a punishment by God and that the sick person was made to suffer because of his sins. But these days things have cooled down in the religious sector, and may we all be grateful for that.

Aromatherapy in its modern form came about in the early years of the 20th century. One man named Gattefosse burned himself by accident. Having nothing else to put on it, he soaked the hand in a lavender infusion and was surprised to see that the hand healed quite quickly. This was truly the birth of natural medicine in the modern world.

The Chinese, of course, had been using aromatherapy and natural medicines for centuries before the Western world caught on to it. Even today, many people around the world would rather visit a Chinese herbalist than go the modern route.

But even with today's modern medicine, there are still some "throw backs" to the dark days. Are you aware that hospitals use purpose bred maggots to clean wounds? This is horrible, right? But it is true. If there is a wound with necrotic (dead) tissue that is difficult to clean, these little eating machines are put into the wound and allowed to munch away all the dead tissue until they clean the wound completely. They only eat dead tissue so there is no harm to the living flesh. The patient heals quicker and the wound closes much faster without the dead tissue. All they have to contend with is the psychological effects of knowing that maggots have literally been making a meal of them!

Another weird and wacky theory is urine therapy. Yes, you have it. People actually believe that by swallowing small amounts of their own urine actually can cure many diseases in the body. Of course many people would not contemplate doing this but there is some research out there that seems to prove the theory. Perhaps this is where the phrase "getting your own back" hits a little too close to home!

Контрольна робота 102

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

STRONG ACIDS AND STRONG BASES

The common acids that are almost one hundred percent ionized are: HNO_3 - nitric acid HCl_1 - hydrochloric acid H_2SO_4 - sulfuric acid $HClO_4$ - perchloric acid HBr_1 - hydrobromic acid HI_1 - hydroiodic acid.

The acids on this short list are called *strong acids*, because the amount of acid quality of a solution depends upon the concentration of ionized hydrogens. Muriatic acid is the name given to an industrial grade of hydrochloric acid that is often used in the finishing of concrete. Less concentated hydrochloric acid can be found in the human stomach. Strong acids are completely ionized in water. You are not likely to see much HBr or HI in the lab because they are expensive. You are not likely to see perchloric acid in a school setting because it can explode if not treated carefully. Other acids are incompletely ionized, existing mostly as the unionized form. Incompletely ionized acids are called *weak acids*, because there is a smaller concentration of ionized hydrogens available in the solution. Do not confuse this terminology with the concentration of acids. The differences in concentration of the entire acid will be termed *dilute* or *concentrated*.

In the list of strong acids, sulfuric acid is the only one that is *diprotic*, because it has two ionizable hydrogens per formula (or two mols of ionizable hydrogen per mol of acid). (Sulfuric acid ionizes in two steps. The first time a hydrogen ion splits off of the sulfuric acid, it acts like a strong acid. The second time a hydrogen splits away from the sulfate ion, it acts like a weak acid.) The other acids in the list are *monoprotic*, having only one ionizable proton per formula. Phosphoric acid, H_3PO_4, is a weak acid. Phosphoric acid has three hydrogen ions available to ionize and lose as a proton, and so phosphoric acid is *triprotic*. We call any acid with two or more ionizable hydrogens *polyprotic*.

Likewise, there is a short list of strong bases, ones that completely ionize into hydroxide ions and a conjugate acid. All of the bases of Group I and Group II metals except for beryllium are *strong bases*. Again, like the strong acids, the strong bases are completely ionized in water solution. Lithium, rubidium and cesium hydroxides are not often used in the lab because they are expensive. The bases of Group II metals, magnesium, calcium, barium, and strontium are strong, but all of these bases have somewhat limited solubility. Barium hydroxide has a high enough solubility to really call it the only dibasic strong base. Magnesium hydroxide has a particularly small solubility. Potassium and sodium hydroxides both have the common name of *lye*. Soda lye (NaOH) and potash lye (KOH) are common names to distinguish the two compounds.

$LiOH_1$ - lithium hydroxide
$NaOH_1$ - sodium hydroxide
KOH_1 - potassium hydroxide
$RbOH_1$ - rubidium hydroxide
$CsOH_1$ - cesium hydroxide
($Mg(OH)_2$ - magnesium hydroxide)
($Ca(OH)_2$ - calcium hydroxide)
($Sr(OH)_2$ - strontium hydroxide)
$Ba(OH)_2$ - barium hydroxide

The bases of Group I metals are all *monobasic*. The bases of Group II metals are all *dibasic*. Aluminum hydroxide, $Al(OH)_3$ is *tribasic*. Any material with two or more ionizable hydroxyl groups would be called *polybasic*. Most of the alkaline organic compounds (and some inorganic materials) have an amino group -(NH_2) rather than an ionizable hydroxyl group. The amino group attracts a proton (hydrogen ion) to become -$(NH_3)^+$. (The dash before the $(NH_3)^+$ or (NH_2) indicates a single bonding electron, so this is attached to something else by a covalent bond.) By

the Lowry- Brɯnsted definition, an amino group definitely acts as a base, and the effect of removing hydrogen ions from water molecules is the same as adding hydroxide ions to the solution.
Memorize the strong acids and strong bases. All other acids or bases are weak.

SOLUBILITY AND DISSOCIATION

Now, after considering the bases of Group II metals, is a fine time to think about acidity of a solution and the solubility of the compound. Calcium and magnesium hydroxides are used in *antacids*, materials used to combat gastrointestinal acidity. How can that be if they are strong bases? In order to act as a base, the material must be dissolved. Almost all of these bases that are dissolved are dissociated, or ionized, but the low solubility of these bases makes them safe to swallow. An acid or base must first dissolve before it can dissociate (come apart) or ionize (become a pair of ions).
It is important to notice that just because a compound has a hydrogen or an -OH group as a part of the structure does not mean that it can be an acid or a base. The hydrogens of methane, CH_4, are all very covalently attached to the carbon atom, and the hydrogens do not ionize, so methane is not an acid.. Glycerin (or glycerol) has three -OH groups in its structure, but the -OH groups do not separate as an ion, so glycerin is not a base.
The chemical equation for the dissociation of nitric acid is:

$$HNO_3 \longrightarrow (NO_3)^- + H^+$$

For strong acids and strong bases the equation goes completely to the right. There is none of the original acid or base, but only the ions of the material unattached to each other in the water.

II. Read and translate the text. Answer the following questions.

What is chelation therapy?
What diseases are most responsive to fasting?
What kind of therapy does the physician recommend for the treatment of rheumatoid arthritis, hypertension, back pain?
Comment on therapeutic purposes of acupuncture.

Chelation Therapy (key–LAY–shun)

Chelation therapy is used to treat a variety of health problems. It is a safe, nonsurgical treatment used to rid the body of excess toxins, particularly metals. Chelating agents used in this therapy are available in over-the-counter formulas that can be taken orally at home, and in intravenous solution that must be administered under the supervision of a physician. Chelation agents are used to bind with heavy toxic metals (cadmium, lead and mercury) and excrete them from the body. Chelation therapy proved to be useful in the treatment of atherosclerosis and other circulatory disorders, in the treatment of gangrene. Chelating agents break up the atherosclerotic plague deposits, unclog the arteries, and permit more normal blood flow.

Fasting is an effective and safe method of helping the body detoxify itself. It is recommended for any illness, as it gives the body the rest it needs to recover. Acute illnesses, colon disorders, allergies and respiratory diseases are most responsive to fasting. By fasting regularly, you give all of your organs a rest, and thus help reverse the aging process and live a longer and healthier life.

Hydrotherapy – the therapeutic use of water, steam, and ice – has been used for centuries to effectively treat injuries and a wide range of illnesses. Treatment techniques include baths. Hospitals, clinics, and spas worldwide use forms of hydrotherapy as safe and effective methods for treating such conditions as AIDS, back pain, bronchitis, cancer, hypertension, muscle pain and inflammation, and rheumatoid arthritis.

Acupuncture is used to restore proper energy flow, and as a result good health. Completely safe acupuncture has no known side effects. This ancient Chinese practice is based on inserting

thin needles at specific point in the body. They may be left in place from a few minutes to half an hour. Acupuncture is perhaps commonly used to relieve pain, including backache, migraine and headaches. Studies have indicated that it may stimulate the production of endorphins, the body's own painkillers.

III. Complete the sentences with the adjectives from the box.

unconscious, incurable, unpasteurized, unhygienic, inadequate, impalpable, unwell, inactive, incapable, unhealthy

1. He was found _____ in the street.
2. He felt _____ and had to go home.
3. She is _____ of feeding herself.
4. The children have a very _____ diet.
5. The nurse noted that the patient had developed an _____ pulse.
6. She used to play a lot of tennis, but she became _____ in the winter.
7. _____milk can carry bacilli.
8. Cholera spread rapidly because of the _____ conditions in the town.
9. The patient was showing signs of an _____ mental condition.
10. He is suffering from an _____ disease of the blood.

IV. Put the verbs into a proper tense form.

1. The employee's _____ and _____ the information on health care provider's in ophthalmology when you send them the tasks for the new project next week *(review, update).*
2. It turned out that the woman _____ a splitting headache when she presented the report *(experience).*
3. The whole day I _____ the medical history of the patient *(learn).*
4. This physician _____ in the next operation *(assist).*
5. There is something wrong with her, she ____ rapidly _____ weight *(get on).*
6. At midnight he ____ still _____ on the article *(work).*
7. Tomorrow the students _____ for the examination all day long *(prepare).*
8. The man did not noticed what _____ around him, because he _____ a badly-wounded girl *(go on, examine).*
9. I _____ to you right now! _____ you _____ me? *(speak, believe/not).*

Do not disturb me. I _____ my mother's current medications *(write out).*

V. Translate the following sentences into English. Pay attention to the tense forms.

1. Я впевнений, що тобі не вдасться з ним поговорити, він буде дуже зайнятий.
2. Лікар вивчав історію хвороби нового пацієнта, коли у госпіталь привезли постраждалих внаслідок авіакатастрофи.
3. Він не буде допомагати тобі у виконанні завдання, адже у нього запланована зустріч із лікарем.
4. У санаторії наявні всі умови для комфортного життя, я проводжу тут час чудово.
5. Коли ти повернешся, я буду працювати над проектом.
6. Мій брат поводився так егоїстично! Це на нього зовсім не схоже.
7. Дуже сумно, що вік бере своє, і дідусь втрачає зір та слух.
8. Жінка все ще сиділа у холі, коли оголосили діагноз.
9. Чому вона постійно скаржиться? Що її турбує на цей раз?

10. Опівночі він все ще працював, хоча почувався хворим і мріяв лише про те, щоб лягти спати.

VI. Give adjectives to the following words.

to confirm		*to explore*	
to sense		*to inhibit*	
virus		*metabolism*	
cancer		*progress*	
blood		*fungus*	
intestine		*endemia*	
focus		*foetus*	
reproduction		*to persist*	
to extend		*to transmit*	

Контрольна робота 103

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

TITRATION

The word "titration" rhymes with "*tight nation*." The medical use of this word is a little different, but in chemistry titration refers to a commonly used method of finding the concentration of an unknown liquid, by comparing it with a known liquid (or known mass of solid in solution). An acid-base titration is good to consider when learning the method, but there are more uses for the technique. The measure of oxalate ion using potassium permanganate in a warm acid environment is a good example of a redox titration. The Mohr titration is a determination of chloride concentration using known silver nitrate solution and sodium dichromate an indicator.

A measured amount of the unknown material in a flask with indicator is usually combined with the known material from a buret (rhymes with "sure bet"). The buret is marked with the volume of liquid by a scale with zero on top and (usually) fifty milliliters on the bottom. The buret has some type of valve at the bottom that can dispense the contained liquid.

It is not necessary to start the titration with the known liquid level in the buret at the zero mark, but the level must be within the portion of the buret that is marked. The buret on the left shows about 1.7 ml of the yellow liquid in it because the bottom of the meniscus is between the 1 and 2 mL markings and closer to the 2 mL mark. Most laboratory burets can be read to an accuracy of one hundredth of a milliliter. (The drawing on the left is a bit crude. Most burets show the ten divisions of a milliliter and you can interpolate between the marks.) One reads the buret by getting at eye level to the bottom of the meniscus (curve in the liquid) and comparing the bottom of the meniscus to the marks on the glass. A reading of the buret is taken before and at the end of the titration. The amount of know - concentration liquid used is the difference of the beginning and ending buret reading.

The *endpoint* of the titration is usually shown by some type of indicator. A *pH indicator* is a material, usually an organic dye, that is one color above a characteristic pH and another color below that pH. There are many materials that can serve as pH indicators, each with its own ph range at which it changes color. Some have more than one color change at distinct pH's. Litmus and phenolphthalein are common pH indicators. Litmus is red in acid (below pH 4.7) and blue in base (above pH 8.1). Phenolphthalein (The second 'ph' is silent and the 'a' and both 'e's are long, if that is any help.) is clear in acid (below pH 8.4) and pink- purple in base (above pH 9.9). These ranges may seem large, but near the *equivalence point*, the point at which the materials are equal, there is a large change in pH. The equivalence point may not occur at pH 7, neutral pH, so the appropriate pH indicator must be chosen for the type of acid and base being titrated.

The volume of the material of unknown concentration is known by how much is put into the reaction vessel. The concentration of the standard is known, and its volume is known from the measurement of liquid used in the titration.

If you have a monobasic base and a monoprotic acid, the titration formula can be simplified to:

if C_A = the concentration of the acid and C_B = the concentration of the base and V_A = the volume of acid solution and V_B = the volume of base, then,

$$C_A V_A = C_B V_B$$

II. Replace the Infinitive in brackets by the appropriate tense forms (**Present Perfect, Past Perfect, Future Perfect**).

1. The doctor *(to show)* the results of Magnetic Resonance Imaging by the evening.
2. The patient *(to visit)* a physician as a means of preventive care but after that he was disappointed.

3. The doctor *(not to make)* the auscultation yet because he has lost a stethoscope.
4. The doctor *(not to tell)* the conclusion of the physical examination by the time the patient promises to listen to his advice.
5. The doctor *(to write)* him the prescriptions by the time the patient comes back.
6. The blood pressure *(not to be)* stable since the morning.
7. The surgeon *(not to begin)* the operation by the time he received the results of physical examination.
8. After the boy *(to break)* his legs, he had to have the radiography made.
9. The nurse *(to check)* the blood pressure by the time the doctor came.
10. Finally he *(to examine)* the chest by tapping it with fingers.
11. The doctor refused to make the operation because he *(to see)* the results of the radiography yet.
12. The patient was disappointed because new methods of treatment *(to help)*.
13. The patient *(to wait)* for the ultrasonund examination since the morning.
14. The doctor *(to examine)* the patient's ear and after that he made a conclusion that everything was in order.
15. By the end of the day, another patient *(to make)* Computed Tomography.

III. Put questions to the underlined words.

1. Hospital is an institution for health care providing patient treatment by specialized staff and equipment.
2. During the Middle Ages, hospitals served different functions compared to modern institutions, being almshouses for the poor, hostels for pilgrims, or hospital schools.
3. Outpatients go to a hospital just for diagnosis, treatment, or therapy and then leave without staying overnight.
4. Inpatients are admitted and stay overnight or for several days, weeks or months.
5. A medical facility smaller than a hospital is generally called a clinic.
6. Urgent care is the delivery of ambulatory care in a facility dedicated to the delivery of medical care outside of a hospital emergency department.
7. Urgent care centres are primarily used to treat patients who have an injury or illness that requires immediate care.
8. Intensive-care medicine is a branch of medicine concerned with the provision of life support or organ support systems in patients who are critically ill.
9. Psychiatric hospitals, also known as mental hospitals, are hospitals specializing in the treatment of serious mental disorders.
   Some hospitals are affiliated with universities for medical research and the training of medical personnel.

IV. Put the verbs in brackets in a proper tense (Present Perfect Continuous, Past Perfect Continuous or Future Perfect Continuous).

1. The wound _____ ***(to bleed)*** for half an hour.
2. Before deciding to become a cardiologist, he _____ ***(to practise)*** internal medicine for 7 years.
3. She _____ ***(not to work)*** at a private hospital before she was invited to participate in a voluntary program for physicians.
4. By the year 2036, the Bellevue Hospital _____ ***(to work)*** for 300 years.
5. This woman _____ ***(to spend)*** four weeks at the prenatal clinic before she gives birth to her twins.
6. Today this practitioner is going to conduct his first operation that is why he _____ ***(to prepare)*** since 9 a.m.
7. How long _____ you _____ ***(to practise)*** conventional medicine?

8. _____ proprietory hospitals _____ ***(to earn)*** over three million dollars per year until the government of the country launched a non-profit campaign for special patients?
9. Next year this nurse _____ ***(to take care)*** of the incurables for ten years.
10. The woman _____ ***(to undergo)*** occupational therapy before she was found out to be absolutely healthy.
11. Because of the recent earthquake, by the end of this month the emergency unit _____ ***(not to function)*** for three weeks.
12. _____ the patient _____ ***(to carry out)*** any physical loads before the heart attack happened?
13. The doctors assembled in the hall. They _____ ***(to discuss)*** the most important issues in order to provide the best health care for their patients.
14. _____ the therapeutist _____ ***(to examine)*** those patients since early morning?
15. How much time _____ he _____ ***(to wait)*** for the ambulance when it finally arrives?

The government of France _____ ***(not to finance)*** a number of Ukrainian hospitals for ten years by the year 2020.

V. Fill in the gap with *in, on* or *at* and one of the phrases from the list.

the weekend	***the morning***	***2008***	***two weeks***
her birthday	***lunchtime***	***Tuesday***	***8 a.m.***

1. Our English class usually starts _____ on Friday.
2. I missed a lecture on Emergency Medicine. I'll have to write a report on the missed topic _____.
3. Funny story happened to Mary. She broke her arm_____. She was happy and sad simultaneously.
4. I'll be able to visit my grandfather at the hospital only _____.
5. An exam on Chemistry will be _____.
6. _____ he graduated from medical college and the same year entered the university.
7. The car accident which caused the death of five occurred last week _____.

When students have first classes, they have to wake up early _____ to get to the university on time.

VI. Read and translate the text.

ANTIBIOTICS

Penicillin

The development of penicillin has stimulated the discovery of new antibiotics. There are many centres where routine screening of every possible living organism is undertaken in an effort to isolate new antibiotics. Penicillin is derived from the *Penicillium notatum* mould, and has both bacteriostatic and bacteriocidal effects.

Penicillin is destroyed by acids, alkalies and heat. It is rendered inert by synthetic rubber, and also by some common air bacteria. It passes rapidly from the blood into vascular tissues, but does not so rapidly penetrate the serous membranes or meninges. It is rapidly excreted in the urine. Although pure penicillin is non-toxic, impurities may cause such minor disturbances as fever and urticaria.

Administration. Penicillin is given by intramuscular injection, and the daily dose may be calculated by allowing 5.000 units per lb. body-weight, divided into six-hourly injections. Attempts have been made to prolong the action of penicillin by delaying its absorption, and hence, by giving larger doses at longer intervals, relieve the patient of frequent injections.

Penicillin may also be given intrathecally; into the serous cavities; into the accessory nasal sinuses; into the conjunctival sac; or it may be administed in lozenges or applied to the skin as a spray, or in a cream.

Streptomycin

Streptomycin is the outcome of a systematic search for an antibiotic in the treatment of infections in which penicillin and sulphonamides have proved ineffective. It Is dispensed as sulphate, hydrochloride, trihydrochloride, calcium chloride, or phosphates.

Streptomycin is derived from *Adinotnyces* (resp. *Streptomyces) griseus,* and its great value lies in its bactericidal effect upon the tubercle bacillus. It is often effective against coccal infections caused by *B. pyocyaneus, B. coli, B. proteus,* and *B. friedlanderi,* while in combination with sulphadiazine, it is effective in meningitis due to *B. influenzae.*

Unfortunately, streptomycin is more toxic than other antibiotics, and these effects are naturally more likely when it has to be used over a long period, as in the case of tuberculous meningitis and miliary tuberculosis. It may account for persistent low fever and give rise to skin rashes, but its most injurious effect is on the nervous system, where it may damage the vestibular mechanism, interfere with vision, and lead to considerable mental impairment. The intrathecal administration of streptomycin gives rise to a cell reaction and increase of protein in the cerebrospinal fluid, which may take several weeks to subside after treatment has been stopped.

Oral administration of streptomycin is ineffective in the treatment of systemic infections since 98% of the drug ingested is excreted in the faeces unchanged.

Chloramphenicol (Chloromycetin) and Aureomycin

Chloromycetin is a crystalline antibiotic obtained by purification and concentration of cultures of *a Streptomyces species* in liquid media. It is a neutral compound which is relatively stable and soluble in watery solutions. The antibiotic is well absorbed from the gastrointestinal tract. Present evidence indicates that it is effective in such rickettsial infections as epidemic and endemic typhus and in typhoid fever. Experimental investigations demonstrate antibacterial activity in vitro and in vivo in animals against other gram-negative bacteria, *Borrelia recurrentis, Mycobacterium tuberculosis,* gram-positive bacteria, and some viruses. The drug appears to be non-toxic for all practical purposes.

Aureomycin is an antibiotic derived from a strain of *Strepto-myces aureofaciens* supplied as the crystalline hydrochloric salt. It is soluble in watery solutions, but deteriorates rapidly in alkaline solution at room temperature. It is well absorbed from the gastrointestinal tract. Since intramuscular injection is quite painful, other routes of administration are preferable. Aureomycin possesses bacteriostatic bactericidal action against numerous gram-positive and gram-negative bacteria and some viruses. It has been shown to be effective in the treatment of several rickettsial infections such as Rocky Mountain spotted fever, and brucellosis, urinary tract infections due to *Escherichia coli,* and lymphogranuloma venereum.

Other antibiotics

Terramycin from *Sireptomyces rimosus* is a yellow, odourless crystalline powder and has actions similar to aureomycin. It is effective in pneumonia, whooping cough, urinary infections. It is used as an antibiotic and antiprotozoan. Toxicity: allergic reactions, nausea, vomiting, diarrhoea. Sometimes there may be nervous symptoms.

Tetracycline. A yellow, odourless, crystalline powder with antibiotic activity against a wide range of organisms. It is usually administered as tetracycline hydrochloride. It is used particularly in the primary bacterial pneumonia, acute cholangitis and cholecystitis, in infections of the urinary system. Toxic effects are vomiting, diarrhoea, allergic reactions.

Erythromycin (Ilotycin). An antibacterial substance produced by the growth of *Streptomyces erythreus,* occurring as white or slightly yellow crystals or powder. It is odourless with a bitter taste. It is easily soluble in alcohol and almost insoluble in water. It is used in infections caused by Grampositive microorganisms (pneumococcus, staphylococcus, and streptococcus) particularly when the organism is resistant to other antibiotics or when the patient is allergic.

Tyrothricin is an extract obtained from *B. brevis.* When applied locally it is of value in treating superficial ulcers, draining abscesses, empyema and pyodermatoses, due to gram-positive organisms such as staphylococci, streptococci and pneumococci. Before administration

the drug should be diluted with sterile distilled water to provide a concentration of 500 mcg./ml. Tyrothricin should never be given parenterally because of its toxicity.

Bacitracin is an antibiotic having a range of activity similar to that of penicillin. It is obtained from a strain of *B. subtilis.* It will inhibit the growth of streptococci, staphylococci, gonococci, meningococci, clostridia, *Tr. pallidum,* and *E. histolytica.* Bacitracin dissolved in sterile normal saline for parenteral use in a concentration of 500 u./cc. may be applied topically, or injected into such pyogenic lesions (caused by susceptible organisms) as furuncles, carbuncles, ulcers, paronychia, conjunctivitis, and pyodermatoses.

Контрольна робота 104

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

SALTS

A *salt* is the combination of an anion (- ion) and a cation (a + ion). Another way to think of a salt is the combination of the anion of a certain acid combined with the cation of a certain base. The neutralization of potassium hydroxide with hydrochloric acid produces water and the salt, potassium chloride. In a solid salt, the ions are held together by the difference in charge. Solid salts usually make crystals, sometimes including specific molar amounts of water, called *water of hydration* into the crystal. If a salt dissolves in water solution, it usually dissociates (comes apart) into the anions and cations that make up the salt.

Salts dissolved in water may not be at neutral pH. Table salt, NaCl, has a neutral pH in water, but baking soda, $NaHCO_3$ is very alkaline when dissolved in water. Take a teaspoonful of baking soda on your hand, wet it, and completely wash your hands with it. (Baking soda is a really fine material for cleaning hands!) There is the hint of the slipperiness of bases on your hands that had to come from the baking soda.

How can you predict the pH of a salt dissolved in water? The actual pH will depend on the type of anion and cation, the solubility of the salt, the temperature of the solution, and concentration of the salt if less than saturated. Here are the general rules:

Salts made of the anion of a strong acid and the cation of a strong base will be neutral salts, that is, the water solution with this salt will have a pH of seven. (Example - sodium chloride)

Salts made of the anion of a strong acid and the cation of a *weak* base will be acid salts, that is, the water solution with this salt will have a pH of less than seven. (Example - ammonium chloride)

Salts made of the anion of a *weak* acid and a strong base will be an alkali salt. The pH of the solution will be over seven. (Example - sodium bicarbonate)

It can be a bit more difficult to tell the pH of a salt solution if the salt is made of the anion of a weak acid and the cation of a weak base. Usually, the main determining factor is whether the weak acid is weaker than the weak base, but that is not always the case. For the purpose of the problems in the review section, you may say that the pH of a 'weak-weak' salt is indeterminate.

Compounds

IONIC AND COVALENT BONDS

A *bond* is an attachment among atoms. Atoms may be held together for any of several reasons, but all bonds have to do with the electrons, particularly the outside electrons, of atoms. There are bonds that occur due to sharing electrons. There are bonds that occur due to a full electrical charge difference attraction. There are bonds that come about from partial charges or the position or shape of electrons about an atom. But all bonds have to do with electrons. Since chemistry is the study of elements, compounds, and how they change, it might be said that chemistry is the study of electrons. If we study the changes brought about by moving protons or neutrons, we would be studying nuclear physics. In chemical reactions the elements do not change from one element to another, but are only rearranged in their attachments.

A *compound* is a group of atoms with an exact number and type of atoms in it arranged in a specific way. Every bit of that material is exactly the same. Exactly the same elements in exactly the same proportions are in every bit of the compound. Water is an example of a compound. One oxygen atom and two hydrogen atoms make up water. Each hydrogen atom is attached to an oxygen atom by a bond. Any other arrangement is not water. If any other elements are attached, it is not water. H_2O is the formula for that compound. This formula indicates that there are two hydrogen atoms and one oxygen atom in the compound. H_2S is hydrogen sulfide. Hydrogen sulfide does not have the same types of atoms as water. It is a different compound. H_2O_2 is the

formula for hydrogen peroxide. It might have the right elements in it to be water, but it does not have them in the right proportion. It is still not water. The word formula is also used to mean the smallest bit of any compound. A molecule is a single formula of a compound joined by covalent bonds. *The Law of Constant Proportions* states that a given compound always contains the same proportion by weight of the same elements.

II. Read and translate the text

Pharmacy

Pharmacy is the health profession that links the health sciences with the chemical sciences and it is charged with ensuring the safe and effective use of pharmaceutical drugs. The scope of pharmacy practice includes more traditional roles such as compounding and dispensing medications, and it also includes more modern services related to health care, including clinical services, reviewing medications for safety and efficacy, and providing drug information. **Pharmacists**, therefore, are the experts on drug therapy and are the primary health professionals who optimize medication use to provide patients with positive health outcomes. An establishment in which pharmacy (in the first sense) is practised is called a **pharmacy (chemist's/drug store)**. In the United States and Canada, drug stores commonly sell not only medicines, but also miscellaneous items such as candies (sweets), cosmetics (skin-care creams, lotions, powders, perfumes, lipsticks, fingernail and toenail polish, eye and facial makeup, towelettes, coloured contact lenses, hair dyes, hair sprays and gels, deodorants, baby products, bath oils, bubble baths, bath salts, etc.) and magazines, as well as groceries.

The word pharmacy is derived from its root word *pharma* which has been used since the 15^{th}–17^{th} centuries. In addition to pharma responsibilities, the pharma offered general medical advice and a range of services that are now performed solely by other specialist practitioners, such as surgery and midwifery. The pharma often operated through a retail shop which, in addition to ingredients for medicines, sold tobacco, patent medicines and herbs.

In the United Kingdom, medication will fall into one of three categories:

- **Prescription Only Medications (POM)** are usually available only with a valid prescription from a doctor or via internet suppliers. The medicine has been specifically prescribed for the patient holding the prescription, so it is considered safe for only the recipient to take. Just several examples of these include most antibiotics, and all antidepressants or antidiabetic medications. Drugs also included as POM are high-strength painkillers such as Oxycodone and Tramadol, medications such as Sildenafil (Viagra) and Diazepam (Valium), and certain topical preparations such as Corticosteroids.
- **Pharmacy-Only Medications (P)** contain chemicals, the strengths or doses of which are more likely to cause interactions, or need basic instruction on use by a health professional. The pharmacist will, in theory, determine whether the medicine is safe for the particular customer based on his/her responses to a set of questions. Sometimes this is known as over-the-counter or "behind-the-counter" medication. These do not require a doctor's prescription, just a discussion with a pharmacist. Examples of these include some sleep aid tablets, deworming tablets, drugs for headache, drugs for cough, painkillers with small amounts of Codeine (up to 12.8 mg per tablet), ointments, etc.
- **General Sales List (GSL)**, drugs are available off the shelf with no pharmacy training required to sell (so they can be sold anywhere, such as supermarkets). In general, they are considered safe for most people when taken correctly. Examples of these include painkillers such as Paracetamol and Ibuprofen as well as other safe medications such as antiallergy tablets, laxative medication, and skin creams. Hygiene products including: soap, hair shampoo, toothbrushes, tooth paste, cotton swabs, antiperspirant, facial tissue, mouthwash, nail files, skin cleansers, and other products (cotton wool, disposable syringes, bandage, adhesive patches, droppers and gauze) are also sold here.

All drugs should be stored according to conditions (temperature, relative humidity, light, etc.) described on the label. Temperatures should be controlled and monitored using calibrated monitoring devices. Refrigerators and freezers used to store drugs should be free from frost build-up, allow for adequate air distribution and orderly storage within the chamber, have sensors for continuous monitoring and alarms located at the points representing the temperature extremes.

Community pharmacies usually consist of a retail storefront with a dispensary where medications are stored and dispensed. Hospital pharmacies usually stock a larger range of medications, including more specialized medications, than would be feasible in the community setting. Because of the complexity of medications including specific indications, effectiveness of treatment regimens, safety of medications (i.e., drug interactions) and patient compliance issues, many pharmacists practising in hospitals gain more education and training after pharmacy school through a pharmacy practice residency. Clinical pharmacists provide direct patient care services that optimizes the use of medication and promotes health, wellness, and disease prevention.

III. Find synonyms in the text to the following words.

to connect	
institution	
various	
to propose	
exclusively	
accessible	
through	
powerful	
reaction	
non-prescription	
to demand	
analgesics	
to keep	
to observe	
sufficient	
useful	
permanent	
to assist	

IV. Find the opposites in the text to the following words.

wholesale	
to separate	
to buy	
dangerous	
out of reach	
dryness	
inadequate	
temporary	

contraindications	
disease	
to obstruct	
to use	

V. Answer the following questions.

1. *What do pharmacies usually sell?* 2. *Which drugs are sold exclusively according to prescription?* 3. *Which drugs are available without prescription?* 4. *What does the term "over-the-counter" imply?* 5. *What does the scope of pharmacy practice include?* 6. *What were the services performed by pharmacies in the 15th-17th centuries?* 7. *How many drug categories are there in the United Kingdom?* 8. *What are the conditions according to which all drugs should be stored?* 9. *What units do community pharmacies consist of?* 10. *How can pharmacists gain more practice?*

VI. Put questions to the words underlined.

1. The first drugstores were opened by Muslim pharmacists <u>in Baghdad in 754</u>.
2. In ancient Japan, the men <u>who fulfilled roles similar to pharmacists</u> were respected.
3. In the United States, a pharmacist must complete <u>4 years</u> of graduate level training at a pharmacy school.
4. As pharmacotherapy specialists, pharmacists have responsibility <u>for direct patient care</u>.
5. <u>Apothecary</u> is a historical name for a medical professional who formulates and dispenses materia medica to physicians, surgeons and patients.
6. The apothecary offered general medical advice and a range of services that are now performed solely by other specialist practitioners, <u>such as</u> <u>surgery and midwifery</u>.
7. <u>By the 15th century</u>, the apothecary had gained the status of a skilled practitioner.
8. Apothecaries used their own measurement system, <u>the apothecaries' system</u>, to provide precise weighing of small quantities.

<u>Medicinal chemistry</u> is the science involved with designing, synthesizing and developing pharmaceutical drugs.

Контрольна робота 105

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

IONIC BONDS

Some atoms, such as metals tend to lose electrons to make the outside ring or rings of electrons more stable and other atoms tend to gain electrons to complete the outside ring. An *ion* is a charged particle. Electrons are negative. The negative charge of the electrons can be offset by the positive charge of the protons, but the number of protons does not change in a chemical reaction. When an atom loses electrons it becomes a positive ion because the number of protons exceeds the number of electrons. Non-metal ions and most of the polyatomic ions have a negative charge. The non-metal ions tend to gain electrons to fill out the outer shell. When the number of electrons exceeds the number of protons, the ion is negative. The attraction between a positive ion and a negative ion is an ionic bond. Any positive ion will bond with any negative ion. They are not fussy. An ionic compound is a group of atoms attached by an ionic bond that is a major unifying portion of the compound. A positive ion, whether it is a single atom or a group of atoms all with the same charge, is called a *cation*, pronounced as if a cat were an ion. A negative ion is called an *anion*, pronounced as if Ann were an ion. The name of an ionic compound is the name of the positive ion (cation) first and the negative (anion) ion second.

The *valence* of an atom is the likely charge it will take on as an ion. The names of the ions of metal elements with only one valence, such as the Group 1 or Group 2 elements, are the same as the names of the elements. A sodium atom that has lost the electron in its outside shell is a positive ion, sodium ion, Na^{+}. A magnesium atom that has lost the two electrons in its outside shell is a plus two (double positive) magnesium ion, Mg^{++}.The names of the ions of nonmetal elements (anions) develop an -ide on the end of the name of the element. Nonmetal atoms tend to GAIN electrons, so when a nonmetal atom collects an extra electron, it will become a negative ion. For instance, fluorine ion is fluoride, F^{-}; oxygen ion is oxide, $O^{=}$, a double negative ion because it gains TWO electrons; and iodine ion is iodide, I^{-}. There are a number of elements, usually transition elements that have more than one valence and have a name for each ion, for instance, ferric ion is an iron ion with a positive three charge. Ferrous ion is an iron ion with a charge of plus two. There are a number of common groups of atoms that have a charge for the whole group. Such a group is called a polyatomic ion or radical. Chemtutor suggests it is best to learn by rote the list of polyatomic ions with their names, formulas and charges and the elements with more than one valence the same way.

THE CONTINUUM BETWEEN IONIC AND COVALENT BONDS

In an attempt to simplify, some books may seem to suggest that covalent and ionic bonds are two separate and completely different types of attachment. A covalent bond is a shared pair of electrons. The bond between the two atoms of any diatomic gas, such as chlorine gas, Cl_2, is certainly equally shared. The two chlorine atoms have exactly the same pull on the pair of electrons, so the bond must be exactly equally shared. In cesium fluoride the cesium atom certainly donates an electron and the fluoride atom certainly craves an electron. Both the cesium ion (Cs^{+}) and the fluoride (F^{-}) ion can exist in solution independently of the other. The bond between a cesium and a fluoride ion to make cesium fluoride (CsF) would be clearly ionic because the difference in electronegativities (ΔEN's) is so large.

The amount of pull on an atom has on a shared pair of electrons, called electronegativity, is what determines the type of bond between atoms. Considering the Periodic Table without the inert gases, electronegativity is greatest in the upper right of the Periodic Table and lowest at the bottom left. The bond in francium fluoride should be the most ionic. Some texts refer to a bond that is between covalent and ionic called a polar covalent bond. There is a range of bond between purely ionic and purely covalent that depends upon the electronegativity of the atoms around that

bond. If there is a large difference in electronegativity, the bond has more ionic character. If the electronegativity of the atoms is more similar, the bond has more covalent character.

II. Read and translate the text. Answer the questions.

1. Who are pharmacists?
2. What do pharmacists specialize in?
3. In what branches of pharmacy may pharmacists work?
4. What is meant under the term *clinical pharmacology*?
5. What is pharmacology concerned with?

Pharmaceutical specialties

Pharmacists are highly-trained and skilled health care professionals who perform various roles to ensure optimal health outcomes for their patients. Pharmacists are health professionals who are experts in the use of medicines, participate in management of diseases, where they optimize and monitor the drug therapy or interpret medical laboratory results – in collaboration with physicians and/or other health professionals. Pharmacists work in clinics, hospitals, medical laboratories and community pharmacies throughout the world.

Historically, the fundamental role of pharmacists as health care practitioners is to distribute drugs that have been prescribed by a physician. Nowadays, pharmacists advise patients and health care providers on the selection, dosages, interactions, and side effects of medications. Pharmacists monitor the health and progress of patients to ensure the safe and effective use of medication. They may also practise compounding; however, most medicines are produced by pharmaceutical companies in a standard dosage and drug delivery form.

Pharmacist's roles may include, but are not limited to: clinical medication management, reviewing medication regimens, general health monitoring, compounding medicines, general health advice, providing specific education to patients about disease conditions and medications, oversight of dispensing medicines on prescription, provision of over-the-counter medicines, counseling and advice on optimal use of medicines, pharmacokinetic evaluation, education of physicians and other health care providers on medications and their proper use, providing pharmaceutical information.

Pharmacists may work in a number of pharmaceutical fields:

Pharmacology is the branch of medicine and biology concerned with the study of drug action. More specifically, it is the study of the interactions that occur between a living organism and chemicals that affect normal or abnormal biochemical function. The field encompasses drug composition and properties, interactions, toxicology, therapy, and medical applications. The two main areas of pharmacology are pharmacodynamics and pharmacokinetics. Pharmacodynamics discusses the interactions of chemicals with biological receptors, and pharmacokinetics discusses the absorption, distribution, metabolism, and excretion of chemicals from the biological systems.

Clinical pharmacology is the science of drugs and their clinical use. Clinical pharmacology connects the gap between medical practice and laboratory science. The main objective is to promote the safety of prescription, maximize the drug effects and minimize the side effects. Their responsibilities to patients include analyzing adverse drug effects, therapeutics, and toxicology including reproductive toxicology, cardiovascular risks, and psychopharmacology.

Toxicology is a branch of biology, chemistry, and medicine concerned with the study of the adverse effects of chemicals on living organisms. It is the study of symptoms, mechanisms, treatments and detection of poisoning, especially the poisoning of people.

Pharmacotherapy is the treatment of disease through the administration of drugs. A dispensing chemist is a professional allowed to fulfil prescriptions.

A pharmacy technician is a pharmacy staff member who works under the direct supervision of a licensed pharmacist, and performs many pharmacy-related functions. Job duties include dispensing prescription drugs and other health care products to patients, as well as working with doctor's offices and insurance companies to ensure correct medications are provided and payment is received. Pharmacy technicians often do the routine tasks associated with preparing

prescribed medications and providing drugs to patients, but may also do compounding of medications, verbal prescriptions and doctor calls, expense and medication orders, returns and expired credits, and non-licensed pharmacy management. Licensed pharmacists check all medications before they go to the patient, and only pharmacists may counsel patients on the proper use of medications. In hospital pharmacy, especially, pharmacy technicians generally oversee the operational management of the dispensary and manufacturing units, freeing the pharmacists to participate and develop extended clinical pharmacy roles, such as independent prescribing.

In the coming decades, pharmacists are expected to become more integral within the health care system. Rather than simply dispensing medication, pharmacists will be paid for their patient care skills.

III. Fill in the gaps with the correct form of the verb in brackets using the Passive Voice.

1. It's a big pharmacy. Twenty people _____ *(to employ)* there.
2. The boat sank quickly but fortunately everybody _____ *(to rescue)* by the doctor.
3. Equipment _____ not _____ *(to send) there.*
4. You _____ *(to tell)* three times this week that she is coming home for a year for her health reasons.
5. The first medical book _____ *(to write)* in Latin and a few years ago it _____ *(to translate)* into Ukrainian.
6. Our things _____ *(to pack)* for two hours and we were impatiently pacing up and down the room when at last we heard the sound of wheels.
7. This invention _____ very much _____ *(to speak)* about.
8. The drugs _____ *(to post)* a week ago and it arrived yesterday.
9. The doctors room _____ *(to clean)* when the doctor arrived.
10. We _____ *(to advise)* to go to the doctor.
11. Why don't you go and take the prescription? It is ready. It _____ *(to type)* these two hours.
12. Pharmacology _____ sometimes _____ *(to consider)* the fourth discipline of pharmacy. Although pharmacology is essential to the study of pharmacy, it is not specific to pharmacy. Therefore it _____ usually _____ *(to consider)* to be a field of the broader sciences.
13. A new hospital near the airport _____ already _____ *(to build).*
14. They _____ *(to say)* to visit the doctor if they want to be healthy.
15. She moved here in 1900. Biology _____ *(to teach)* at our school since then.
16. The word "pharma" _____ *(to use)* since the 15^{th}- 17^{th} centuries.
17. All drugs _____ *(to store)* according to conditions described on the label.

Various drugs _____ *(to develop)* to fight the different bacteria.

IV. Fill in the gaps with appropriate prepositions. Translate the text.

Compounding is the practice ____ preparing drugs in new forms. _____ example, if a drug manufacturer only provides a drug as a tablet, a compounding pharmacist might make a medicated lollipop that contains the drug. Patients who have difficulty swallowing the tablet may prefer to suck the medicated lollipop instead.

Another form ____ compounding is ___ mixing different strengths (g, mg, mcg) ____ capsules or tablets to yield the desired amount ____ medication indicated ____ the doctor. This form ___ compounding is found ___ community or hospital pharmacies or in-home administration therapy.

Compounding pharmacies specialize ____ compounding, although many also dispense the same non-compounded drugs that patients can obtain ____ community pharmacies.

V. Rearrange the following words to make up sentences.

1. extremely/prescribed/hazardous/can be/Drugs/by/way/the wrong/doctors/in/if/used.
2. drugs/trying/prescription/to cut/We/the price/of/are.
3. prescriptions/Many/record/medicine/for/clay/cuneiform/Sumerian/tablets.
4. with/before/pharmacist/any/your/taking/Consult/drugs/doctor/or.
5. pharmacies/a wide/medications/Most/range/of/sell.
6. well/creams/always/sold/are/Anti-age.
7. blisters/any/put/Do/or/ointments/the burn/lotions/break/not/or/on/any.
8. the pills/will/to swallow/If/some/drink/water/easier/you/it/be.
9. to inject/insulin/with/I/myself/have.
10. evenly/over/the lotion/Apply/the skin.

VI. Give nouns to the following words.

to exhibit		*to augment*	
to design		*to dispose*	
to insert		*to detect*	
to contract		*to explore*	
to allow		*to convert*	
to invade		*to initiate*	
susceptible		*to mutate*	
to occur		*effective*	
to persist		*blind*	
to expose		*to share*	
to transmit		*to reproduce*	
prevalent		*to disrupt*	
to screen		*to confirm*	
possible		*to contaminate*	
weak		*impure*	
frequent		*to predispose*	

Контрольна робота 106

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

WHAT IS A CHEMICAL REACTION?

A chemical reaction is material changing from a beginning mass to a resulting substance. The hallmark of a chemical reaction is that new material or materials are made, along with the disappearance of the mass that changed to make the new. This *does not mean* that new elements have been made. In order to make new elements, the nuclear contents must change. There are magnitudes of difference in the amounts of energy in ordinary chemical reactions compared to nuclear reactions. The energy of rearrangement of the nuclei of atoms to change to new elements is enormous compared to the smaller energies of chemical changes. The alchemists, in their efforts to change less expensive metals to gold, did not have the fundamental understanding of what they were attempting to do to appreciate the difference.

A chemical equation is a way to describe what goes on in a chemical reaction, the actual change in a material. Chemical equations are written with the symbols of materials to include elements, ionic or covalent compounds, aqueous solutions, ions, or particles. There is an arrow pointing to the right that indicates the action of the reaction. The materials to the left of the arrow are the *reactants*, or materials that are going to react. The materials to the right of the arrow are the *products*, or materials that have been produced by the reaction. The *Law of Conservation of Mass* states that in a chemical reaction no mass is lost or gained. The Law of Conservation of Mass applies to individual types of atom. One could say that for any element, there is no loss or gain of that element in a chemical reaction. There are such things as reversible reactions, reactions in which the products reassemble to become the original products. Reversible reactions are symbolized in chemical equations by a double-headed arrow, but the standard remains to call the materials on the left the reactants and the materials on the right the products.

In order to write the chemical equations, you must first know the formulas for the materials involved. The formulas must be written on the proper side of the arrow - - reactants on the left and products on the right. The order in which the reactants and products are written does not matter, just as long as every material is on the proper side. Once the materials involved in the reaction are written correctly, DON'T TOUCH THEM. If you need to draw a box around each participant in the reaction to keep your grubby paws off the materials, do it.

Very often you will see the descriptions of the materials in the reaction in parentheses after the material. A gas is shown by (*g*). A solid material is shown by (*s*). A liquid is shown by (*l*). A material dissolved in water (an aqueous solution) is shown by (*aq*). An upwards pointing arrow (↑) indicates a gas being produced, and a downwards pointing arrow ↓ indicates a solid precipitate being produced.

II. Read and translate the text.

History of Pharmacy

The history of pharmacy as an independent science is relatively young. The origins of pharmaceutical historiography back to the first third of the 19th century. Until the birth of pharmacy as an independent science, there is a historical evolution from antiquity to the present day that marks the course of this science, always connected to the medicine. The earliest known compilation of medicinal substances was an Indian Ayurvedic treatise (6th century BC). However, the earliest text dates to the 3rd or 4th century AD. Many Sumerian (late 6th millennium BC – early 2nd millennium BC) cuneiform clay tablets record prescriptions for medicine.

Ancient Egyptian pharmacological knowledge was recorded in various papyri as early as 1550 BC. The earliest known Chinese manual on materia medica dates back to the 1st century AD. Earlier literature included lists of prescriptions for specific ailments, exemplified by a manuscript *"Recipes for 52 Ailments"*, found in a tomb, sealed in 168 BC.

In Ancient Greece there was a group of experts in medicinal plants. Probably the most important representative was Diocles of Carystus (4th century BC). He is considered to be the source for all Greek pharmacotherapeutic treatises between the time of Theophrastus and Dioscorides. The Greek physician Dioscorides is famous for writing a five volume book in the 1st century AD. The Latin translation *De Materia Medica (Concerning medical substances)* was a basis for many medieval texts, and was built upon by many middle eastern scientists during the Islamic Golden Age.

In Japan (5th-8th centuries) the men who fulfiled roles similar to those of modern pharmacists were highly respected. The pharmacists – and even pharmacist assistants – were assigned status superior to all others in health-related fields such as physicians and acupuncturists. In the Imperial household, the pharmacist was even ranked above the two personal physicians of the Emperor.

There is a stone sign for a pharmacy with a tripod, a mortar, and a pestle opposite one for a doctor in the Arcadian Way in Ephesus near Kusadasi in Turkey. The current Ephesus dates back to 400 BC and was the site of the Temple of Artemis, one of the seven wonders of the world. In Baghdad the first pharmacies, or drugstores, were established in 754 during the Islamic Golden Age. By the 9th century, these pharmacies were state-regulated.

The advances made in the Middle East in botany and chemistry led medicine in medieval Islam substantially to develop pharmacology. The medical uses of chemical compounds were promoted and the preparation of medicines by sublimation and distillation was pioneered. Sabur Ibn Sahl (869) was, however, the first physician to initiate pharmacopoedia, describing a large variety of drugs and remedies for ailments. Al-Biruni (973-1050) wrote one of the most valuable Islamic works on pharmacology entitled *The Book of Drugs*, where he gave detailed knowledge of the properties of drugs and outlined the role of pharmacy and the functions and duties of the pharmacist. Ibn Sina (Avicenna) described no less than 700 preparations, their properties, mode of action and their indications. He devoted in fact a whole volume to simple drugs in *The Canon of Medicine*.

In Europe pharmacy-like shops began to appear during the 12th century. In 1240 emperor Frederic II issued a decree by which the physician's and the apothecary's professions were separated. The first pharmacy in Europe (still working) was opened in 1241 in Trier, Germany. In Europe there are old pharmacies still operating in Dubrovnik, Croatia located inside the Franciscan monastery, opened in 1317 and one in the Town Hall Square of Tallinn, Estonia dating from at least 1422. The oldest is claimed to be set up in 1221 in the Church of Santa Maria Novella in Florence, Italy, which now houses a perfume museum. The medieval Esteve Pharmacy, located in Llívia, a Catalan enclave close to Puigcerdà, is also now a museum dating back to the 15th century, keeping albarellos from the 16th and 17th centuries, old prescription books and antique drugs.

III. Translate the sentences into English using the Passive Voice.

1. "Наша аптека" була заснована 50 років тому.
2. Біля нашої школи будується нова аптека.
3. Лікарям дозволили видавати ліки самим.
4. Приблизно 90 мільйонів ліків продається щорічно у цій аптеці.
5. Аптеку ще не збудовано.
6. Біля дверей почувся голос пацієнта.
7. Ту аптеку було збудовано минулого року, а цю лікарню будують ще й досі.
8. Цей метод вважається найкращим, бо лікарі бачать його результат.
9. Я думав про все, що було сказано протягом конференції, тоді пішов до лікаря і все йому розказав.
10. Ліки були продані аптекарем.
11. Тим не менше, ця практика була піддана критиці як потенційно небезпечна.
12. Оригінальна ідея була висунута аптекарем учора.

13. Про цю хворобу багато говорять не тільки у нашій країні, а й в інших.
14. Коли я повернувся в місто, аптека все ще будувалась.

IV. Change part of speech of the capitalized words to complete the sentences. Translate the text.

Since about the year 2000, a growing number of Internet pharmacies have been **ESTABLISHMENT** _____ worldwide. Many of these pharmacies are similar to community pharmacies, and in fact, many of them are **ACTUAL** _____ operated by brick-and-mortar community pharmacies that serve **CONSUME** _____ online and those that walk in their door. The primary **DIFFER** _____ is the method by which the medications are requested and received. Some customers **CONSIDERATION** _____ this to be more **CONVENIENCE** _____ and private method rather than traveling to a community drugstore where another customer might overhear about the drugs that they take. Internet pharmacies (also known as Online Pharmacies) are also **RECOMMENDATION** _____ to some patients by their physicians if they are homebound.

While most internet pharmacies sell prescription drugs and **REQUIREMENT** _____ a valid **PRESCRIBE** _____, some internet pharmacies sell prescription drugs without requiring a prescription. Many customers order drugs from such pharmacies to avoid the **"INCONVENIENT"** _____ of visiting a doctor or to obtain medications which their doctors were unwilling to prescribe. However, this practice has been criticized as potentially **DANGER** _____, especially by those who feel that only doctors can **RELIABLE** _____ assess **CONTRAINDICATE** _____, risk/benefit ratios, and an individual's overall suitability for use of a medication.

Of particular concern with internet pharmacies is the **EASY** _____ with which people, youth in particular, can obtain controlled substances via the internet without a prescription issued by a doctor.

RECENT _____ developed online services provide **INFORM** _____ about pharmaceutical products but do not offer prescriptions or drug dispensations. These services often promote generic drug alternatives by offering **COMPARE** _____ information on price and **EFFECTIVE** _____.

V. Match the terms with the root "pharm" with their definitions.

1	**pharmacology**	*a*	relating to medicinal drugs, or their preparation, use, or sale
2	**pharmacopoeia**	*b*	a person who is professionally qualified to prepare and dispense medicinal drugs
3	**pharmacognosy**	*c*	a shop or hospital dispensary where medicinal drugs are prepared or sold
4	**pharmacodynamics**	*d*	the branch of medicine concerned with the uses, effects, and modes of action of drugs
5	**pharmaceutic**	*e*	an official publication containing a list of medicinal drugs with their effects and directions for their use
6	**pharmacist**	*f*	medical treatment by means of drugs
7	**pharmacy**	*g*	the branch of knowledge concerned with medicinal drugs obtained from plants or other natural sources
8	**pharmacogenetics**	*h*	the branch of pharmacology concerned with the effects of drugs and the mechanism of their action
9	**pharmacotherapy**	*i*	the branch of pharmacology concerned with the way drugs are taken into, move around, and are eliminated from the body
10	**pharmacokinetics**	*j*	the branch of pharmacology concerned with the effect of genetic factors on reactions to drugs

VI. Fill in the blanks with the right word from the list below. You may use each word only once.

administer, after, antibodies, diseases, fight, generally, harmless, including, injected, orally, prevent, prevention, serums, smallpox, substances, symptoms, vaccines

Doctors use two main types of drugs for the _____ of disease:

Vaccines contain dead or _____ germs. They cause the body to develop _____ called _____ that act to _____ disease. Doctors _____ _____ before a person has been exposed to such _____ as poliomyelitis or _____ . Vaccines are usually _____ but sometimes are given _____ . Serums contain antibodies that _____ off the germs of certain diseases, _____ scarlet fever and lockjaw. These drugs are given _____ a person has been exposed to the disease, or after _____ of the disease have appeared. _____ are _____ administered by injection.

Контрольна робота 107

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

PROPERTIES OF SOLUTIONS

A *solution* is a mixture of materials, one of which is usually a *fluid*. A fluid is a material that flows, such as a liquid or a gas. The fluid of a solution is usually the *solvent*. The material other than the solvent is the *solute*. We say that we *dissolve* the solute into the solvent.

Some solutions are so common to us that we give them a unique name. A solution of water and sugar is called *syrup*. A solution of sodium chloride (common table salt) in water is called *brine*. A sterilized specific concentration (0.15 molar) of sodium chloride in water is called *saline*. A solution of carbon dioxide in water is called *seltzer*, and a solution of ammonia gas in water is called *ammonia water*.

A solution is said to be *dilute* if there is less of the solute. The process of adding more solvent to a solution or removing some of the solute is called *diluting*. A solution is said to be*concentrated* if it has more solute. The process of adding more solute or removing some of the solvent is called *concentrating*. The *concentration* of a solution is some measurement of how much solute there is in the solution.

It might initially offend your sensibilities to consider a solution in which the solvent is a gas or a solid. The molecules of a gas do not have much interaction among them, and so do not participate to a large extent in the dissolving process. Solids are difficult to consider as solvents because there is a lack of motion of the particles of a solid relative to each other. There are, however, some good reasons to view some mixtures of these types as solutions. The molecules of a gas do knock against each other, and the motion of a gas can assist in vaporizing material from a liquid or solid state. The fan in a 'frost free' home freezer moves air around inside the freezer to sublimate any exposed ice directly into water vapor, a process clearly akin to dissolving. Solid metals can absorb hydrogen gas in a mixing process in which the metal clearly provides the structure.

True solutions with liquid solvents have the following properties:

PROPERTIES OF SOLUTIONS

1. The particles of solute are the size of individual small molecules or individual small ions. One nanometer is about the maximum diameter for a solute particle.
2. The mixture does not separate on standing. In a gravity environment the solution will not come apart due to any difference in density of the materials in the solution.
3. The mixture does not separate by common fiber filter. The entire solution will pass through the filter.
4. Once it is completely mixed, the mixture is *homogeneous*. If you take a sample of the solution from any point in the solution, the proportions of the materials will be the same.
5. The mixture appears clear rather than cloudy. It may have some color to it, but it seems to be transparent otherwise. The mixture shows no *Tyndall effect*. Light is not scattered by the solution. If you shine a light into the solution, the pathway of the light through the solution is not revealed to an observer out of the pathway.
6. The solute is completely dissolved into the solvent up to a point characteristic of the solvent, solute, and temperature. At a *saturation point* the solvent no longer can dissolve any more of the solute. If there is a saturation point, the point is distinct and characteristic of the type of materials and temperature of the solution.
7. The solution of an ionic material into water will result in an *electrolyte* solution. The ions of solute will separate in water to permit the solution to carry an electric current.
8. The solution shows an increase in osmotic pressure between it and a reference solution as the amount of solute is increased.

9. The solution shows an increase in boiling point as the amount of solute is increased.
10. The solution shows a decrease in melting point as the amount of solute is increased.
11. A solution of a solid non-volatile solute in a liquid solvent shows a decrease in vapor pressure above the solution as the amount of solute is increased.

II. Replace the Infinitive in brackets by the appropriate tense form using the Passive Voice.

1. Pharmacists _____ often _____ ***(to refer)*** to as clinical pharmacists and they often specialize in various disciplines of pharmacy.
2. Ambulatory care pharmacy _____ _____ ***(to base)*** primarily on pharmacotherapy services that a pharmacist provides in a clinic.
3. Where did you get those drugs which _____ _____ ***(to find)*** in your room? Don't disturb him. He is working at his helpful drug. The necessary work of medicine _____ _____ _____ ***(to create)***.
4. The doctor rose to speak and _____ warmly _____ ***(to greet)*** by the audience. Pharmacists in this area _____ _____ ***(to train)*** to participate in medication management system development, deployment and optimization.
5. When I came up to the pharmacy, it _____ already _____ _____ ***(to lock)***.
6. I haven't received the medication yet. It might _____ _____ _____ ***(to send)*** to the wrong address.
7. The patient didn't realize that his conversation with the doctor _____ _____ _____ ***(to record)***.
8. Pharmacies _____ typically _____ ***(to require)*** to have a pharmacist on-duty at all times when open.
9. The plan _____ _____ _____ ***(to discuss)*** for two hours.
10. But it was too late. She _____ already _____ _____ ***(to see)*** after operation.
11. Vitamins _____ not _____ ***(to find)*** only in animal foods but they are necessary for good health.
12. As the surgeon was ill, the patient _____ _____ ***(to operate)*** by his colleague.
13. Operating room _____ _____ _____ ***(to clean)*** at the moment.
14. The roof of the hospital _____ _____ ***(to damage)*** in a storm a few days ago.
15. I knew that the plant _____ _____ _____ ***(to build)*** for two years.

III. Translate into English.

1. Фармацевти вивчають фармакологію, фармакогнозію, хімію, біохімію, органічну хімію, фармацевтичну хімію, мікробіологію, фізіологію, анатомію, фармакокінетику та інші науки.
2. Програма навчання також охоплює діагностику, зосереджуючи увагу на проведенні лабораторних аналізів, визначенні стану пацієнта, лікуванні та призначенні ліків (вибір найбільш відповідних ліків для певного пацієнта).
3. Біохімія – наука про хімічні речовини, хімічні реакції та процеси, які відбуваються в живому організмі.
4. Медична хімія – це наука, яка включає розробку, синтез та розвиток фармацевтичних ліків.
5. Медична хімія вивчає ідентифікацію, синтез та розвиток нових хімічних речовин, які можуть використовуватися з лікувальною метою, а також займається вивченням існуючих ліків та їх біологічних властивостей.
6. Заклад, в якому продають ліки, називається аптекою. В США в аптеках, зазвичай, продаються не лише ліки, але й різні речі, наприклад, солодощі, косметика, журнали та інше.
7. В Європі магазини аптечного типу почали з'являтися в 12 столітті. Перша аптека в Європі (діюча дотепер) була відкрита в 1241 році в Німеччині.

8. Ліки в аптеці зберігаються в шафах, холодильниках, на полицях при відповідній температурі, що не перевищує кімнатну температуру.
9. В аптеці також продають трави, вату, бинт, зубну пасту, зубні щітки, термометри та інші необхідні товари.

IV. Give the opposites of the following words by adding negative prefixes.

___normal, _____available, ____effective, _____directly, _____formation, ____different, _____comfortable, ____necessary, ____voluntary, ____sensitive, ____histamine, to _____place, _____convulsant, to ____allow, _____conscious, to _____form.

V. Read and translate the text.

Pharmacy-Museum in Lviv

The Pharmacy, located in the building at the corner of Drukarska and Stauropegiyska Streets, was set up as early as in 1735 by Natorp, a military pharmaceutist, and since that time it has served people for over two centuries and a half.

In 1966, on the basis of the ancient pharmacy, a museum of pharmacy history was established which in 1972 was conferred the honorary title of People's Pharmacy.

The People's Museum enjoys great popularity. This is expressively substantiated by the following figures. During the first year of its existence, the Museum was visited by nearly 6.000 excursionists, and in 1988 their number was over 280 thousand. Over 11.000 excursions have been guided, each providing a thrilling contact of people with exciting pages of the history of pharmaceutics and medical practice – in old times and today.

Observation of the Museum's exhibit begins in the spacious room the interior of which represents a trade hall of the former antique pharmacy. The walls are lined with tall built-in closets made in the 18^{th} and early 19^{th} centuries. The lower part of the closets contains drawers with the names of medicines and in the top glazed closets wooden, metal, porcelain, earthenware and glassware pharmaceutical utensils are kept.

The ceiling of the trade hall is ornamented with polychromatic painting executed at the beginning of the 19^{th} century by the Viennese masters. It represents symbolic images of the 4 invariably eternal elements, with inscriptions in Latin: "Aqua" (water), "Ignis" (fire), "Terra" (earth), "Aer" (air). According to the teaching of Empedocles, the Ancient Greek materialist philosopher, these elements constitute the basis of all living matter.

The most attractive exhibits in the trade hall are the unique pharmaceutical scales, especially the 18^{th} century ones contained in a wooden fretted case and the scales supported by two. nearly one meter high, bronze figurines, one of Aesculapius, the Ancient Greek god of medicine, and the other of his daughter Hygiea, the goddess of health.

The Second Hall of the Museum is the former material room in which medical preparations were stored. Today it contains collections of utensils for keeping medicines, part of pharmaceutical equipment of different epochs, old patent medicines, etc.

The exhibited recipe books are of documentary value. From them one can learn about the assortment, prescriptions and cost of medicines, and to get an idea of the private pharmaceutical practice. The Museum has 8 recipe books, the oldest being dated from 1805.

Among the exhibits are patterns of pill-making hand-machines of foreign firms, a pharmacy advertisement of the 19^{th} century, etc.

The semblance of an old pharmacy laboratory is presented in the Third Hall. The exhibits displayed here familiarize the visitor with different stages of processing the vegetable stuff and making up medicines from it, with the devices and instruments used for this purpose.

This hall displays herbaria of rare officinal plants from various countries of the world: the golden root, eleuterokokk, aralia, Chinese lemon tree and ginseng. Medicines of animal origin are exhibited on a separate shelf. Some of them are no longer used in medicine nowadays, whereas formerly they were much in demand. Among the exhibits there are specimens of propolis and mumio.

In the former cook-room of the Pharmacy (the Fourth Hall), the Coctoria, the visitor is invariably attracted by the universal infusing distillatory vessel of the 18th century. Being 200 years old, it still can be used today for preparing infusions and decoctions, to fuse ointment components, to distil water.

The pharmaceutical equipment displayed in the hall – drying ovens, stills, copper scoops, distillers – is very characteristic of the former Pharmacy Coctoria.

Handsomely designed stands and posters, which constitute the basic exposition of the fifth hall, give a plain and comprehensive story of pharmacy from ancient times to our day and expound the major stages of its development in Egypt, Ancient Greece, in Middle-East and West European countries, as well as in this country. They provide information about the activities of Hippocrates, Galenus, Avicenna, Paracelsus, about the well-known *"Salerno Code of Health"*.

A few separate stands cover the history of pharmacy in Lviv and the Western regions of Ukraine. By its sources it goes as far back as the 13th century when Constancia, the wife of Prince Lev Danylovych who made Lviv the capital of Galicia-Volynian Principality, founded a hospital and a pharmacy at the Monastery of the Dominicans. Among the famous pharmaceutists living and working in the 14th-15lh centuries were Clemens, Vasyl Rusyn, Olbrakht, Pavel, Bartolomeo, Alexander. From the second half of the 16th century and up to the end of the 18th century in one of the houses in Rynok Square there was a chemist's shop founded by the Lorencowicz family of pharmaceutists.

The final section of the exposition in the Fifth Hall covers the development of pharmacy in Ukraine's western districts, in the Lviv area over the Soviet times in particular. Lviv has some specialized pharmacies: one of herbs, geriatric one, children's, and the homoeopathic department at Pharmacy No.24.

The exploration of the Museum's displays is continued in the restored premises of the four-storeyed outbuilding and in the Gothic and Pharmacy basements. In one of the rooms a medieval alchemist's laboratory has been restored after old engravings. Of chief attraction here is the smelting furnace. An appropriate atmosphere is created by the retorts, distillation flasks, amphoras, mortars and the chest (safe) of the 16th century. The entrance door decorated with designs and a panelled bench add harmony to the laboratory interior.

In the Gothic and Pharmacy basements the interior of the early 18th century has been reconstructed. An amazing revelation is the diorama of "The Medieval Lviv Pharmacy". Another basement holds an exposition covering old cures. The displays in the Pharmacy basement have been designed after the records in old recipe books, for in the Middle Ages basements were mainly used as subsidiary premises.

From the pharmacy basements one can walk into an inner courtyard, the only unit in Lviv where restoration means proved successful in reconstructing the semblance of a well-to-do 16th-17th centuries city-dweller.

Exploration of the Museum ends in the last exhibition hall which is in the annex. Every item displayed here takes us from the remote past into the present day: the exhibits testify to a high level of material and technical base of chemistry and pharmacy enterprises in the Lviv district, they tell us about the restructuring that is under way in this very important branch of health care. There is a Response Book on the table. It holds exciting entries in various languages left by representatives of many countries showing paying tribute to the material culture of our people.

Контрольна робота 108

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

OTHER TYPES OF MIXTURE

Take a spoonful of dirt and vigorously mix it with a glass of water. As soon as you stop mixing, a portion of the dirt drops to the bottom. Any material that is suspended by the fluid motion alone is only in *temporary suspension*. A portion of the dirt makes a true solution in the water with all of the properties of the above table, but there are some particles, having a diameter roughly between 1 nm and 500 nm, that are suspended in a more lasting fashion. A suspended mixture of particles of this type is called a *colloid*, or *colloidal suspension*, or *colloidal dispersion*.

For colloids or temporary suspensions the phrase *dispersed material* or the word *dispersants* describes the material in suspension, analogous to the solute of a solution. The phrase*dispersing medium* is used for the material of similar function to a solvent in solutions.

As with true solutions, it is a bit of a stretch to consider solids as a dispersing medium or gases as forming a large enough particle to be a colloid, but most texts list some such. A*sol* is a liquid or solid with a solid dispersed through it, such as milk or gelatin. *Foams* are liquids or solids with a gas dispersed into them. *Emulsions* are liquids or solids with liquids dispersed through them, such as butter or gold-tinted glass. *Aerosols* are colloids with a gas as the dispersing medium and either a solid or liquid dispersant. Fine dust or smoke in the air are good examples of colloidal solid in a gas. Fog and mist are examples of colloidal liquid in a gas.

Liquid dispersion media with solid or liquid dispersants are the most often considered. Homogenized whole milk is a good example of a liquid dispersed into a liquid. The cream does not break down into molecular sized materials to spread through the milk, but collects in small *micelles* of oily material and proteins with the more ionic or *hydrophilic*portions on the outside of the globule and the more fatty, or oily, or non-polar, or *hydrophobic* portions inside the ball-shaped little particle. Blood carries liquid lipids (fats) in small bundles called *lipoproteins* with specific proteins making a small package with the fat.

Proteins are in a size range to be considered in colloidal suspension in water. Broth or the independent proteins of blood or the casein (an unattached protein) in milk are colloidal. There are many proteins in the cellular fluids of living things that are in colloidal suspension.

Colloidal dispersants in water stay in suspension by having a layer of charge on the outside of the particle that is attractive to one end of water molecules. The common charge of the particles and the water *solvation layer* keep the particles dispersed. A *Cottrell precipitator* collects the smoke particles from air by a high voltage charge and collection device. Boiling an egg will denature and coagulate the protein in it. Proteins can be fractionally 'salted out' of blood by adding specific amounts of sodium chloride to make the proteins coagulate. The salt adds ions to the liquid that interfere with the dispersion of the colloidal particles.

Colloids with liquid as a dispersing agent have the following properties:

PROPERTIES OF COLLOIDS

1. The particles of dispersant are the between about 500 nm to 1 nm in diameter.
2. The mixture does not separate on standing in a standard gravity condition. (One 'g.')
3. The mixture does not separate by common fiber filter, but might be filterable by materials with a smaller mesh.
4. The mixture is not necessarily completely homogeneous, but usually close to being so.
5. The mixture may appear cloudy or almost totally transparent, but if you shine a light beam through it, the pathway of the light is visible from any angle. This scattering of light is called the *Tyndall effect*
6. There usually is not a definite, sharp saturation point at which no more dispersant can be taken by the dispersing agent.

7. The dispersant can be *coagulated*, or separated by clumping the dispersant particles with heat or an increase in the concentration of ionic particles in solution into the mixture.
8. There is usually only small effect of any of the colligative properties due to the dispersant.
9. CONCENTRATION
10. The *concentration* of a solution is an indication of how much solute there is dissolved into the solvent. There are a number of ways to express concentration of a solution. By far the most used and the most useful of the units of concentration is *molarity*. You might see '6 M HCl' on a reagent bottle. The 'M' is the symbol for *molar*. One molar is one mol of solute per liter of solution. The reagent bottle has six mols of HCl per liter of acid solution. Since the unit 'molar' rarely appears in the math of chemistry other than as a concentration, to do the unit analysis correctly, you will have to insert concentrations into the math as 'mols per liter' and change answers of 'mols per liter' into molar.
11. Molality is concentration in mols of solute per kilogram of solvent. Mol fraction is the number of mols of solute per number of mols of solution. Weight-weight percent (really mass percent) is the number of grams of solute per grams of solution expressed in the form of a percent. Mass-volume concentration is the number of grams of solute per milliliter of solution. There are other older units of concentration, such as Baume (or Baumé), that are still in use, mainly in industrial chemicals.
12. Normality is the number of mols of effective material per liter. In acid-base titrations, the hydroxide ion of bases and the hydrogen (hydronium) ion of acids is the effective material. Sulfuric acid (H2SO4) has two ionizable hydrogens per formula of acid, or one mol of acid has two mols of ionizable hydrogen. 0.6 M H2SO4 is the same concentration as 1.2 N H2SO4.
13. We say that sulfuric acid is *diprotic* because it has two protons (hydrogen ions) per formula available. Hydrochloric acid (HCl) is *monoprotic*, phosphoric acid (H3PO4) is *triprotic*, and acids with two or more ionizable hydrogens are called polyprotic. Sodium hydroxide (NaOH) is *monobasic*, calcium hydroxide (Ca(OH)2) is *dibasic*, and aluminum hydroxide (Al(OH)3) is *tribasic*.
14. Where 'X' is the number of available hydrogen ions or hydroxide ions in an acid or base, N, the normality, is equal to the molarity, M, times X.
15. The normality system can be used for redox reactions, but the effective material is now available electrons or absorption sites for electrons. Consider the following reaction, #43 in the redox section.
16. In a sulfuric acid solution potassium permanganate will titrate with oxalic acid to produce manganese II sulfate, carbon dioxide, water, and potassium sulfate in solution.

II. Read and translate the text

Drug forms and classes

Drugs are available in a variety of forms designed to make their administration more effective. Factors that influence the form of a drug include the route to be used for administration, the type and rapidity of the response wanted, the condition of the patient (young, elderly), and the specific properties of the drug itself. Drugs can be **solid**, **semisolid**, or **liquid**. Solid forms of drugs include *tablets, capsules, lozenges, pellets (small pills), patches, powders,* and *granules*. Examples of semisolid forms include *suppositories, pastes, ointments, creams,* and *foams*. Liquids include *lotions, solutions, liniments, elixirs, tinctures, extracts, suspensions,* and *emulsions*. Drugs may be introduced and absorbed into the body through several routes. These include oral ingestion, inhalation, topical applications to the skin or mucous membranes, and injections.

Depending upon the jurisdiction, medications may be divided into over-the-counter drugs which may be available without special restrictions, and prescription only medic**ations** which

must be prescribed by a licensed medical practitioner. Drugs may be grouped in several ways, and any preparation may be placed in more than one drug family. The following description of drug families is based on their respective mechanisms of action.

There are two major types of **neuropharmacologic drugs**: **autonomic drugs** and **central nervous system drugs**. Autonomic drugs influence the body in a manner similar to the action of the parasympathetic and sympathetic nerves of the autonomic nervous system. The function of the sympathetic nerve network in the body is (1) to stimulate the flow of epinephrine from the adrenal gland, (2) to increase heart rate, (3) to constrict blood vessels, and (4) to dilate air passages. Central nervous system drugs, which affect the central nervous system, are of two main types: those which stimulate the nerves in the brain and spinal cord, stimulants, and those which depress the nerves in the brain and spinal cord, depressants. Central nervous system stimulants are used to speed up vital processes in cases of shock and collapse, and also to oppose the depressant effect of other drugs. Stimulants produce a temporary feeling of euphoria (well-being) and help to relieve lethargy. Examples of drug stimulants are *caffeine* and *amphetamine*. There are several types of central nervous system depressants. These include *analgesics, hypnotics, sedatives and barbiturates, tranquilizers, anticonvulsants, alcohol,* and *anaesthetics.*

Antihistamines block the action of the chemical called histamine which is found in the body. Histamine is produced by most cells and especially by sensitive cells under the skin and in the respiratory system. Antihistamines, by blocking the action of histamine in the body, can relieve the allergic symptoms which histamine produces. Antihistamines cannot cure the allergic reaction, but they can relieve its symptoms.

Cardiovascular drugs may be divided into three groups: drugs that affect the heart; drugs that affect blood pressure; and drugs that prevent blood clotting. Drugs may affect the heart in two major ways: changing the rate and forcefulness of the heartbeat and altering the rhythm of the heartbeat. **Vasodilators** are drugs which relax the muscles of vessel walls, thus increasing the size of blood vessels. These drugs are used in treating blood vessel diseases, heart conditions, and high blood pressure (hypertension). *Nitrites* are drugs which are used as vasodilators. Nitroglycerine dilates all smooth (involuntary) muscles in the body, but has a greater effect on the muscles of the coronary blood vessels. The relaxation of the muscle fibres around the blood vessels of the heart increases the width of these heart vessels and increases blood flow to the heart muscle. **Vasoconstrictors** are drugs which constrict muscle fibres around blood vessels and narrow the size of the vessel opening. They may act directly on the muscles of blood vessels or stimulate a region in the brain which relays the message to the vessels. Vasoconstrictors are needed to raise blood pressure, increase the force of heart action, and stop local bleeding. Drugs that prevent blood clotting are called *anticoagulants*. They are used to prevent the formation of clots in veins and arteries. These clots may cause occlusion (thrombosis) of the blood supply to a vital organ, such as the brain, or may travel from their point of origin to a new site and produce a sudden occlusion of a distant organ (embolism).

Gastrointestinal drugs have different pharmacologic activities and are used mainly to relieve uncomfortable and potentially dangerous symptoms of the gastrointestinal tract.

An **antibiotic** is a chemical substance produced by a microorganism (bacterium or simple plant called a mould). The antibiotic can be *bactericidal* (able to kill microorganisms such as bacteria) or *bacteriostatic* (inhibit the growth of other microorganisms). **Antiviral drugs** are a class of medication used specifically for treating viral infections. Like antibiotics for bacteria, specific antivirals are used for specific viruses. Unlike most antibiotics, antiviral drugs do not

destroy their target pathogen; instead they inhibit their development. **Anti-inflammatory drugs** make up about half of analgesics, remedying pain by reducing inflammation.

Vitamins are necessary for normal body functioning. They are found in plant and animal foods and are needed in only minute quantities for good health.

III. Match the names of drugs with their types.

1	a wide range of drugs to relieve pain	*a*	**narcotics**
2	they help to remove excess fluid from the body	*b*	**stimulants**
3	they increase activity	*c*	**anti-inflammatory**
4	these drugs are used to reduce and suppress swelling	*d*	**diuretics**
5	excellent painkillers originally derived from opium	*e*	**analgesics**
6	these help suppress nausea and vomiting	*f*	**sedatives**
7	one of the best known drugs which anyone can buy and use to relieve pain, inflammation and fever	*g*	**laxatives**
8	they prevent blood clots forming	*h*	**decongestants**
9	they soothe patients and help them sleep	*i*	**anti-emetics**
10	these are used to calm people and relieve anxiety	*j*	**digitalis**
11	taken to relieve constipation	*k*	**aspirin**
12	these help to clear a stuffy nose	*l*	**anticoagulants**
13	antibiotics are sometimes given this name because of the rapid relief they bring to many infectious diseases	*m*	**insulin**
14	it is used in the treatment of diabetes	*n*	**miracle drugs**
15	it is used to increase the performance of a weak heart	*o*	**tranquillizers**

IV. Find synonyms in the text to the following words.

way		*thrombus*	
to diminish		*occlusion*	
to influence		*accessible*	
impermanent		*reaction*	
to calm		*cheerfulness*	
whole		*apathy*	
phobia		*extra*	
worry		*consumption*	
to impede		*to raise*	
to change		*haemorrhage*	

V. Translate the following sentences into English.

1. Ліки, готові до вживання, називаються формами ліків. Форми ліків є офіцінальні (стандартні), виготовлені на фармацевтичних підприємствах, або магістральні, виготовлені в аптеці згідно з рецептом лікаря.
2. У залежності від консистенції складників (інгредієнтів), форми ліків можуть бути тверді, м’які і рідкі.
3. Рідкі форми ліків готують розчиненням твердих речовин у рідині або змішуванням кількох рідких речовин; екстрагуванням (настоюванням та виварюванням) розчинних складових частин з рослинних або тваринних лікарських матеріалів спиртом, ефіром, водою або сумішшю спирту з ефіром.

4. Речовини в рідкій формі, як правило, швидше всмоктуються і швидше діють, ніж ті самі речовини в твердій формі (в порошках, таблетках, пілюлях).
5. Залежно від способу приготування ліків, рідкі форми поділяються на розчини, мікстури, настоянки, відвари, емульсії, аерозолі.
6. Рідкі ліки можуть бути введені не тільки перорально, але й під шкіру внутрішньовенно, внутрішньом'язово, внутрішньокістково, в серце і навіть через дихальні шляхи.
7. Розчинниками для готування розчинів буває дистильована вода, рідше спирт, олія, гліцерин.
8. До твердих форм ліків належать: порошки, капсули, таблетки, пілюлі, драже, гранули, збори.

VI. Answer the following questions.

1. *What are the factors that influence the form of a drug?* 2. *Give examples of solid forms of drugs.* 3. *Give examples of semisolid drugs.* 4. *What are the liquid forms of drugs?* 5. *What is the effect of neuropharmacological drugs?* 6. *In what way do antihistamines relieve allergic symptoms?* 7. *What are the three main groups of cardiovascular drugs?* 8. *How are drugs that prevent blood clotting called?* 9. *Why is the formation of clots dangerous for our body?* 10. *Where are vitamins found?* 11. *What are the two main types of antibiotics?* 12. *How are drugs introduced into the body?*

Контрольна робота 109

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

DISSOLVING GASES INTO LIQUIDS

Gases are more easily measured by knowing the pressure, volume, and temperature of the gas. Seltzer water and ammonia water are two good examples of solutions of a gas in a liquid. Seltzer, or carbonated water, is the result of pressing carbon dioxide gas into water. Seltzer is used as the base liquid in any carbonated beverage. The bubbles in beer or sparkling wines are also due to carbon dioxide, but the CO2 is a natural product of the fermentation process, so it does not have to be added artificially. Ammonia water, also called ammonium hydroxide solution, is made from ammonia (NH3) being pressed into water. It is used as a weak base and as a cleaning material, particularly for glass.

Because the process is better done under pressure, it is often difficult to directly observe the actual dissolving done in most cases. The notable exception is the addition of dry ice, solid carbon dioxide, to water as described in the section on carbon dioxide.

As with a solid dissolving in a liquid, a gas dissolves in a liquid more easily with agitation or mixing, but that is where the similarity ends. Remove a carbonated beverage from its container and it becomes obvious that pressure is necessary to keep the gas in the liquid. The drink fizzes and bubbles, releasing the gas. As the beverage sits for a few hours, the taste becomes what we describe as 'flat.' Almost all of the carbon dioxide has escaped from the liquid. The only CO2 remaining in the water will produce a partial pressure equal to the partial pressure of the gas in the atmosphere. Water carries dissolved oxygen from the partial pressure of the oxygen in the atmosphere.

As the combination of liquid and gas is NOT the favored (lowest energy) condition, an increase in temperature causes the separation. Lower temperature favors dissolving the gas into the liquid. You can verify this experimentally on your own. Leave one can of carbonated beverage at room temperature. Refrigerate a can of the same carbonated beverage. Gently heat a third can of the same beverage. Open them all and record the results. You are likely to find that the gas stays in solution better in the cooler liquid.

HOW TO DISSOLVE A GAS INTO A LIQUID

1. Increase the gas pressure on the liquid.
2. Decrease the temperature.
3. Mix.

LIQUIDS IN LIQUIDS

A solution of two liquids is relatively uncomplicated. For the most part, liquids either mix together or they don't. When liquids will mix together, they usually do so in all proportions and are said to be*miscible*. If they do not mix, as oil and water, they are said to be *immiscible*. Using ethyl alcohol and water as examples of miscible liquids, we can have a solution of the two liquids with one drop of alcohol in a bucketful of water or one drop of water in a bucketful of alcohol.

Immiscible liquids can make a mixture of the nature of a colloidal suspension by very finely dividing one of the liquids and dispersing it through the other liquid. Milk fresh from the cow separates into a milk and a cream layer, the cream rising to the top. The cream of milk is a fatty material of a lower density, so it floats. The milk may be *homogenized*, a process that violently shakes the milk so that the cream forms very small ball-shaped particles. This homogenized milk will remain well mixed with normal treatment.

The stability of homogenized milk as a mixture is helped by the presence of the proteins of milk. Proteins often have areas of large amounts of available electrical charge and areas of very little

charge. The areas of higher charge are more soluble in water and the areas of lower charge are more soluble in the fat of the cream. In this way the protein acts as a *surface active agent*, or *surfactant*. A surfactant is a large molecule with one area in one liquid and another area in another. Proteins of milk on the surface of the small globules of fat in homogenized milk will keep the globules from attaching back to each other, so the milk stays homogenized. Soaps and detergents are surfactants that help get oily dirt into suspension in water.

Agitation (mixing) is usually the most important factor in making a liquid-liquid mixture. The agitation of milk to homogenize it is a good example for colloids, but many other liquids do not mix without considerable agitation. If you make a highly concentrated syrup and pour it into water, the syrup will drop to the bottom of the water and stay there until it is agitated or (in a much longer time) diffusion mixes the layers.

II. Read and translate the text. Answer the following questions.

1. What do you know about homeopathy?
2. What is your attitude towards this area of medicice?
3. Have you or your friends ever taken homeopathic medicine? Has it helped?

Homeopathy

Homeopathy is a form of alternative medicine in which practitioners treat patients using highly diluted preparations that are believed to cause healthy people to exhibit symptoms that are similar to those exhibited by the patient. The basic principle of homeopathy, known as the "law of similar", is "let like be cured by like". It was first stated by German physician Samuel Hahnemann in 1796. Apart from the symptoms, homeopaths examine aspects of the patient's physical and psychological state, then homeopathic reference books known as repertories are consulted, and a remedy is selected based on the totality of symptoms.

Hahnemann observed from his experiments with cinchona bark, used as a treatment for malaria, that the effects he experienced from ingesting the bark were similar to the symptoms of malaria. He therefore decided that cure proceeds through similarity, and that treatments must be able to produce symptoms in healthy individuals similar to those of the disease being treated. He believed that by using drugs to induce symptoms, the artificial symptoms would stimulate the vital force, causing it to neutralise and expel the original disease and that this artificial disturbance would naturally subside when the dosing ceased. It is based on the belief that a substance that in large doses will produce symptoms of a specific disease will, in extremely small doses, cure it.

In 1828, Hahnemann introduced the concept of *miasms*, underlying causes for many known diseases. A miasm is often defined by homeopaths as an imputed "peculiar morbid derangement of the vital force". According to Hahnemann, initial exposure to miasms causes local symptoms, such as skin or venereal diseases, but if these symptoms are suppressed by medication, the cause goes deeper and begins to manifest itself as diseases of the internal organs. Homeopathy maintains that treating diseases by directly opposing their symptoms, as is sometimes done in conventional medicine, is ineffective because all "disease can generally be traced to some latent, deep-seated, underlying chronic, or inherited tendency". Hahnemann originally presented only three miasms, of which the most important was "psora" (Greek for *itch*), described as being related to any itching diseases of the skin, supposed to be derived from suppressed scabies, and claimed to be the foundation of many further disease conditions. Hahnemann believed psora to be the cause of such diseases as epilepsy, cancer, jaundice, deafness, and cataracts. Hahnemann's miasm theory remains disputed and controversial within homeopathy even in modern times.

Homeopathy uses many animal, plant, mineral, and synthetic substances in its remedies. Examples include arsenic oxide, sodium chloride, the venom of the bushmaster snake, opium, and thyroid hormone. Homeopaths also use treatments called nosodes (from the Greek nosos,

disease) made from diseased or pathological products such as faecal, urinary, and respiratory discharges, blood, and tissue.

Today there are about 3,000 different remedies commonly used in homeopathy. Some homeopaths also use techniques that are regarded by other practitioners as controversial. These include *paper remedies*, where the substance and dilution are written on a piece of paper and either pinned to the patient's clothing, put in their pocket, or placed under a glass of water that is then given to the patient, as well as the use of radionics to prepare remedies.

III. Translate the following sentences into English using the Passive Voice.

1. Лікарські засоби дозволять купувати в аптеці за рецептами.
2. Для приготування рідких лікарських форм використовуватимуть лікарські засоби фармакопейного гатунку.
3. Всі види лікарських засобів повинні готуватися в асептичних умовах.
4. Лікарська рослинна сировина не може бути замінена настойками чи екстрактами.
5. В аптеці № 35 з наступного тижня продаватимуть ліки зі знижкою для пенсіонерів та студентів.
6. Серцевосудинні ліки можна поділити на три групи: ліки, які впливають на серце; ліки, які впливають на кров'яний тиск; ліки, які запобігають згортанню крові.
7. Таблетки для запобігання розвитку злоякісних пухлин виготовлятимуть за новою індійською технологією.
8. Ліки можна поділити на безрецептні та рецептурні.
9. В нашій лікарні буде встановлено нове кардіологічне обладнання до кінця наступного місяця.
10. Рідкі форми ліків поділяють на лосьйони, розчини, еліксири, мікстури, настоянки.
11. З березня інсулін видаватимуть безкоштовно всім хворим.
12. Видача сильних знеболювальних ліків строго контролюватиметься головним лікарем.

Нові знеболювальні препарати будуть представлені на міжнародному симпозіумі.

IV. Fill in the gaps with the appropriate prepositions.

Analgesics are agents which act to relieve pain. Examples ____ analgesics are acetylsalicylic acid (aspirin), acetaminophen (tylenol). Aspirin and tylenol are antipyretics (agents _____ fever) as well as analgesics. Hypnotic drugs are those which depress the central nervous system and produce sleep. Sedatives are used to quiet and relax the patient _____ necessarily producing sleep. Tranquilizers are drugs which alter behaviour, allowing _____ control ____ nervous symptoms such as anxiety, depression, fear, or anger. Anaesthetics are drugs which produce loss ____ sensation, and particularly loss of the appreciation ____ pain. General anaesthetics produce loss of sensation _____ the entire body by depressing the central nervous system, producing sleep, unconsciousness, and muscle relaxation. Local anaesthetics relieve or prevent pain _____ a particular area _____ the body.

V. Complete the following sentences. Choose from the box. Some words may be used more than once.

Giving instructions on drug administration

apply	**chew**	**clean**	**continue**	**dip**	**dissolve**	**inhale**	**carry**		
lay	**leave**	**put**	**rub**	**sip**	**spray**	**stick**	**take**	**wear**	

1. You should _____ this insulin kit with you at all times.
2. _____ two of these tablets twice a day.
3. _____ two puffs in each nostril twice a day.

4. _____ the cream to the affected areas every morning.
5. Don't_____ these tablets. Swallow them whole.
6. Ask your brother to help you _____ two drops into each ear in the morning.
7. It's better to _____ the patch on your thigh or lower back.
8. We would advise you to _____ these stockings until you're able to become a bit more active.
9. _____ a little of this ointment on his chest each morning.
10. Just _____ the lozenge under the tongue and allow it to _____ slowly.
11. Make a hot drink and _____ it slowly.
12. _____ the wound with tepid water and _____ it open to the air.
13. _____ one teaspoonful in half a litre of hot water and _____ the steam.
14. _____ the end of the strip into the urine and wait to see if the colour changes.
15. Make sure you _____ with these pills until they're all finished, even if you think you're better.

VI. Give nouns to the following words.

to constrict		*to occlude*	
wide		*to inhibit*	
to ingest		*to grow*	
to administrate		*rapid*	
to dilate		*to introduce*	
to stimulate		*to absorb*	
to depress		*to inhale*	
to appreciate		*to apply*	
forceful		*to prepare*	
to relax		*to describe*	
to act		*anxious*	
to affect		*conscious*	
to prevent		*comfortable*	

Контрольна робота 110

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

SOLUBILITY

For the best view of solubility, we will use the examples of a solid solute dissolved into a liquid solvent. This does not mean that other materials do not work in the same fashion.

The solubility of a solution is a measure of how much of the solute can be dissolved into the solvent. The solution reaches a point called the *saturation point* when no more solute will be accepted by the solvent. Any further addition of solute will result in solid solute mixed in with the saturated solution. Each solvent and solute pair has a characteristic solubility at a given temperature. Usually as you increase the temperature, an increased amount of solute will be able to dissolve.

Take a Pyrex measuring cup and put in exactly a cup of table sugar. Heat water to boiling and pour in a small amount. Notice what happens. The volume of material in the cup appears to shrink! Continue adding boiling water until the level is back up to the 'one cup' mark. Notice the temperature of the solution. It takes heat to dissolve sugar. Stir. You should be able to almost dissolve all the sugar. The solution should be very close to the saturation point at that temperature. The solution should end up at about room temperature. Now add a few heaping tablespoons of sugar. Stir and attempt to dissolve all the sugar. If you succeed, add another few tablespoonsful of sugar. Put the saturated solution with a lot of undissolved sugar into the microwave, and heat until all the sugar is dissolved. If you have a meat thermometer, find the temperature of the boiling mixture. (Be careful. The solution is VERY hot. Handle with something to insulate you from the heat.)

Observe the solution after you take it out of the microwave and put it on the counter. Notice the temperature at which the sugar crystals begin to form again.

If you have done the experiment just right, you may see the crystals appearing at a temperature far below what you might think. If you boil the solution enough in the microwave, you will dissolve all traces of a seed crystal for the saturated solution to deposit sugar onto. At one time your solution will be *supersaturated*, or beyond the normal amount of solute in the solution. Supersaturation is an unstable condition. If any crystal is presented to a supersaturated solution, the crystallization of the solute onto it will occur fairly rapidly.

At home if you have done this demonstration with only sugar and water in a clean cup, don't waste the sugar solution. A little bit of maple flavoring will make it a fine syrup for pancakes, or you can use it in the frosting of the chocolate cake I have published here on the site. Do not eat any material made at school. Lab materials may contain traces of contaminants. If you eat anything in the school laboratory, the school lawyers will turn green and purple, have a conniption fit, and likely take their discomfort out upon you.

Solubility of salts depends upon the type of ions in the salt. There is a very great range of solubility of salts in water. Even the most insoluble, such as silver chloride, have a very small but detectable solubility. Some salts, called *deliquescent salts*, are so soluble that they grab water molecules out of the air and can dissolve themselves in this way.

Using the simplification of classifying materials as either soluble or not in water at room temperature, there are some nice easy general rules for predicting whether or not a salt will dissolve in water. These rules are useful not just for predicting how to make solutions, but ion reactions, such as a double displacement reaction, depend upon the insolubility of a salt as a possible product for the reaction to happen. Depending upon what your instructor suggests, it may be a good idea for you to know the following rules:

(a) Almost all simple ionic compounds with Group I elements (lithium and elements below it on the Periodic Table) or ammonium ion, $(NH_4)^+$, are soluble.

(b) All nitrates $(NO_4)^-$, most sulfates, $(SO_4)^{2-}$, and most chlorides, Cl^-, are soluble. ** Notable insoluble exceptions to this rule are: barium sulfate, $Ba(SO_4)$, lead II sulfate, $Pb(SO_4)$, and silver chloride, AgCl.

(c) Most hydroxides, $(OH)^-$, carbonates, $(CO_3)^{2-}$ sulfides, S^{2-}, and phosphates, $(PO_4)^{3-}$, are insoluble except for the compounds of rule (a). Barium hydroxide, $Ba(OH)_2$ is a soluble exception to this rule.

II. Choose a suitable verb from the box to complete the phrases below. Use each one once.

The effects of drugs

alleviate	**be absorbed**	**cause**	**dilate**	**have**	**impair**	**interfere**
promote	**reduce**	**soothe**	**stimulate**	**suppress**	**replace**	**alleviate**

_____ pain
_____ into the blood stream
_____ the production of hormones
_____ with other drugs
_____ nausea
_____ an inhibitory effect
_____ the ability to drive
_____ the blood vessels
_____ side effects
_____ the heart rate
_____ sleep
_____ inflammation
_____ abnormal loss of body fluids

III. Replace the Infinitive in brackets by the appropriate Passive form.

1. Drugs *(may introduce)* and *(to absorb)* into the body through several routes.
2. The pharmacists *(should require)* to dispense a wide range of preparations for the winter time.
3. The types of medications that people take at home *(can divide)* into two groups: prescription only medications and over-the-counter medications.
4. Other medications *(study)* to determine whether they may be useful for treating patients.
5. We hope these medicines *(to approve)* to treat HIV/AIDS next week.
6. Prescription only medicine *(must prescribe)* by a licensed medical practitioner.
7. Approved medications *(have to prove)* safe and effective.
8. Drugs *(may group)* in several ways.
9. Any preparation *(may place)* in more than one drug family.
10. First aid trainings *(to introduce)* in our university by the next year.
11. Symptoms *(can treat)* effectively in most people with over-the-counter or prescription only medications.
12. There are different forms into which a drug *(may place)* for convenient and effective treatment of disease.
13. This method of treating *(must pay)* great attention to.
14. Most drugs are manufactured for a specific route of administration and *(must use)* as directed for safety and efficiency.

15. Cardiovascular drugs *(may use)* in treating blood vessel diseases, heart conditions and high blood pressure.

IV. Divide the following forms of drugs into the three groups.

1. taken by mouth
2. injected into the body
3. applied to the body surface

capsules	*cream*	*gargle jelly*	*lotion*	*lozenge*	
ointment	*pill*	*powder*	*serum*	*tablet*	*vaccines*

V. Fill the blanks with the right word from the list below. You may use each word once only.

antiseptic	*cleanse*	*disease*	*fester*
ointment	*plaster*	*skin*	*wound*

Treatment of a minor injury

_____ the wound thoroughly and apply an _____ to counteract germs which spread _____. Otherwise the wound may _____. Sticking _____ may be applied or the _____ may be bandaged. _____ may be smeared over the _____.

VI. Read and translate the text.

Medicinal Plants

The plants that possess therapeutic properties or exert beneficial pharmacological effects on the human body are generally designated as "Medicinal Plants". It has been established that the plants which accumulate some secondary metabolites, like alkaloids, glycosides, tannins, volatile oils and contain minerals and vitamins, possess medicinal properties.

Therapeutic efficacy varies during different times or seasons of the year. Roots and rhizomes are best collected from October to February, when the plants are more vigorously storing nutrients in their underground parts. The most suitable time to collect leaves is when the plant is about to bloom. Flowers and inflorescences are collected in the morning after the morning dew has evaporated; just before or shortly after opening. Bark materials and stems are gathered in summer time. When the climate is warm and humid, the bark contains richer nutritive substances including the medicinal metabolites. Preferably, barks and stems should be removed only from fully grown plants. Fully ripened fruits and mature seeds are preferred. Collection of pod fruits is done in the morning to avoid unnecessary opening of the fruit wall to the detriment of losing the seeds. Turn the fresh fruit frequently for even better drying. When the whole plant is desired, it is advisable to harvest the plant at the time when the flowers are all in bloom. Old and withering plants are less effective when used as a source of drugs.

Many medicinal plants are seasonal, some not easily accessible, available only in deep forests or mountain peaks. Such restrictions necessitate ways and devices to store them for future use. Dirt and other foreign substances should be removed. If washing is needed, it should be done quickly to minimize deterioration and loss of active substances. As a rule, all parts of the plant collected should be dried as soon as possible to avoid unnecessary waste of the drug materials through natural processes of denaturation, decay and fungal attacks. Some commonly used storage methods are as follows: Sun-drying method: Spread the herbs over the patio or benches until the materials turn dry and brownish. Shade-drying method: Some plant materials are preferably dried in shade at room temperature by wind action because of heat-labile substances that they contain. Free circulation of air is important. Drying processes should be shortened, if higher drug contents are to be sought for. Floral and fruit materials should be dried by this method. Heat-drying method: Some materials may be placed over an oven and dried under the intense heat released or under regulated soft heat. Plants that contain high sugar and

starch are best preserved by this method. In places where the rain falls throughout the year, this method is strongly recommended. The dried plant materials should be placed in plastic containers or tightly covered bottles; brown coloured bottles are preferred as they minimize deterioration due to sunlight. The storage place should be dry, well-ventilated, and spacious. Dry materials after proper processing can be kept in large open wooden shelves. Materials rich in volatile oils are advised to be kept in airtight containers. Otherwise, their efficacy will decrease as time passes by.

There are several ways to prepare herbs for consumption and use in medicinal remedies. When herbs are prepared by steeping in boiling water to be drunk as tea, they are known as an infusion. If these dried herbs get simmered in hot water, they are called decoction. If mixed with other ingredients and made into cream, they are viewed as the herbal ointment. Herbal compress is a piece of cloth soaked in an infusion or decoction and wrapped and applied externally. Herbal infusions and decoctions can also be used as herbal bath for relaxation and healing. An extraction is any herbal medicine that has as its basis the extracted fluid or properties of a plant, but does not contain particles of the actual plant material itself. Sometimes called tisanes, infusions, extracts obtained by soaking, are the quickest way of producing herbal medicines.

Decoction is the extraction of the water-soluble substances of a drug or medicinal plants by boiling. The art of preparing a good decoction takes minutes to learn and years to master. Made correctly, they are potent medicines that need to be taken only in relatively small amounts. Decoctions are particularly valuable when making medicines from roots or bark, as their active constituents cannot normally be drawn out in sufficient quantities simply by making an infusion. Alcohol is much more effective than water for drawing out the medicinal properties of plants. Thus, many herbalists soak fresh or dried herbs in alcohol for prolonged periods. The resultant mixture (tincture or maceration) is an extremely potent medicine that should be administered in small amounts.

One of the greatest advantages of herbal medicine as a therapy is that it is – when administered correctly – completely safe. Despite the fact that herbal preparations are far safer than synthetic medicines, they must still be used with caution. Some plants are extremely toxic and can cause serious poisoning or even death.

VII. Complete the table with missing forms.

VERB	NOUN	ADJECTIVE
	cure	
to possess		
to attract		
		protective
	maturity	
	oxidation	
		dry
	extraction	
		relative
to value		
	poison	
to prolong		
		reproductive
to vary		
	desire	

to measure		
		irritable
to determine		
	application	
to prefer		

Контрольна робота 111

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

COLLIGATIVE PROPERTIES

The colligative properties of solutions have already been mentioned in the section on properties of solutions. A colligative property is one that depends only on the number of particles in solution rather than the type of particle. Molecular solutes have only one particle per formula, but ionic materials come apart into their ions and have almost as many particles in the solution as there are ions available. The word 'almost' was included on purpose because there is a small tendency for ions to re-associate with each other, making ion pairs that decrease the number of particles. The ion pair effect depends upon the properties of the species dissolved and the concentration of solute. The more concentrated the solute, the greater percentage of ion pairing takes place.

The colligative properties of solutions are:

1. The solution shows an increase in osmotic pressure between it and a reference solution as the amount of solute is increased.

Osmotic pressure occurs when a *semipermeable membrane* divides two solutions, one of which has more solute than the other. A semipermeable membrane is one that lets through water but not some materials in solution or in suspension in the water. Semipermeable membranes are an important part of any living thing. Cell membranes are semipermeable. The membranes on the outside of eggs are semipermeable. Trees pull up water from their roots by osmosis.

Here is an easy way to demonstrate osmotic pressure. Take two similar hen's eggs and keep them in a dilute vinegar solution for a few days. The acid in the vinegar will react with the calcium compounds that are the hardening materials for the shell. There are two semipermeable membranes under the hard shell of the egg. Replace the vinegar solution if the process stops for a few days before all of the shell is removed. When all of the hard shell has gone, compare the size of the eggs. They should be fairly close. Put one egg into pure water (or tap water). Put the other egg into a brine solution (table salt dissolved in water). Observe the eggs over a few days.

Water goes through the semipermeable membrane in a direction to make the particle concentration on either side equal. The egg in just water will absorb water and become very large. The egg in brine will shrivel from water going out of it. The tight skin on the large egg is a demonstration of the pressure provided by osmosis.

Don't eat the eggs. Open them up and see what's inside. Inspect them carefully, particularly the yolk and its size. The membranes of the egg are a pretty good barrier to bacteria, but the stretched membrane particularly may not be able to keep bacteria out. Smell the eggs after you have opened them. Is there an odor that would indicate bacterial contamination? Cook them to see if the proteins react the same way as other eggs, but do not eat them due to the possibility of hidden bacterial contamination.

Red blood corpuscles (in humans) are not much more than semipermeable bags containing oxygen-absorbing protein (hemoglobin) floating in the blood. If you were to pump pure water into a person, the osmotic pressure due to the difference in *osmolarity* would swell and burst the red corpuscles. If the blood plasma has too many dissolved particles, the red corpuscles would shrivel up or *crenate*. Saline is a solution that is designed to be the same osmolarity as the cellular and corpuscular contents.

2. A solution of a solid non-volatile solute in a liquid solvent shows a decrease in vapor pressure above the solution as the amount of solute is increased.

Honey has some moisture in it that is close to saturation in sugar. Take two small shallow dishes and put in an equal (small) amount of honey in one and water in the other. Leave them exposed to the air in the same place, and observe them over a few days. The sugar in the honey will reduce the vapor pressure of the solution.

3. The solution shows an increase in boiling point as the amount of solute is increased.
The boiling point of a liquid is just the point at which the vapor pressure of the liquid equals the surrounding pressure. If the vapor pressure decreases, it will take a greater temperature to boil the liquid.
Put a small amount of honey in the bottom of a glass and about the same level of water in the same kind of glass. Place them both in a microwave oven. Which one boils first? Try the same experiment with various amounts of salt in solution.
4. The solution shows a decrease in melting point as the amount of solute is increased.
It may be that the dissolved materials block the water molecules from attaching on to the rest of the water crystal. Or possibly that the dissolved material holds on to the water molecules more tightly than the water in the crystals.
Whatever the cause, you have seen this in action in the making of homemade barrel ice cream. The barrel on the outside of the ice cream container has ice and salt (sodium chloride) in it. The ice melts (grabs up the heat) at a temperature lower than the usual melting point of water. Just ice in the barrel would not work, because it does not get cold enough to freeze the ice cream inside that has dissolved materials in it itself.

II. Read and translate the text.

Vitamins

A vitamin is an organic compound required as a nutrient in small amounts by an organism. Vitamins regulate chemical reactions by which the body converts food into energy and living tissues. They also are essential nutrients for the healthy maintenance of the cells, tissues, and organs that make up a multicellular organism.

Vitamins are classified as either water-soluble or fat-soluble. In humans there are 13 vitamins: 4 fat-soluble (**A**, **D**, **E**, and **K**) and 9 water-soluble (8 **B** vitamins and vitamin **C**). Water-soluble vitamins dissolve easily in water and are readily excreted from the body with the urine. Because they are not readily stored, consistent daily intake is important. Fat-soluble vitamins are absorbed through the intestinal tract with the help of lipids and are more likely to accumulate in the body.

Vitamin **A** (retinol) is necessary for healthy skin, development of the bones, and good vision. Sources of this vitamin include cod liver oil, yellow, orange and green vegetables, and milk.

Vitamin $\mathbf{B_1}$, also called thiamine, is necessary for changing starches and sugars into energy. It is found in meat and whole-grain cereals, rice.

Vitamin $\mathbf{B_2}$ or riboflavin is essential for complicated chemical reactions that take place during the body's use of food. Milk, cheese, fish, liver, meat, eggs and green vegetables supply vitamin $\mathbf{B_2}$.

Vitamin $\mathbf{B_3}$ is better known as niacin or vitamin **PP**. Cells need niacin in order to release energy from carbohydrates. Liver, yeast, lean meat, fish, nuts, and legumes contain niacin.

Vitamins $\mathbf{B_5}$ (pantothenic acid), $\mathbf{B_6}$ (pyridoxine) and $\mathbf{B_7}$ (biotin) all play a role in chemical reactions in the body. Many foods contain small amounts of these vitamins, but mainly meat, dairy products, eggs and whole-grain cereals.

Vitamins $\mathbf{B_{12}}$ or cobalamin and $\mathbf{B_9}$ (also called folate, folic acid or folacin) are both needed for forming red blood cells and for a healthy nervous system. Vitamin $\mathbf{B_{12}}$ is found in animal products, especially liver. Folate is present in green leafy vegetables.

Vitamin **C** or ascorbic acid is necessary for the maintenance of the ligaments, tendons, and other supportive tissue. It is considered to be the main immune vitamin. It is found in fruits, especially in kiwifruits, oranges and lemons.

Vitamin **D** or calciferol is necessary for the body's use of calcium. It is present in cod liver oil and vitamin **D**-fortified milk.

Vitamin **E** or tocopherol helps maintain cell membranes. It is one of the known antioxidants. Unrefined vegetable oils, especially wheat germ oil, and whole-grain cereals are especially rich in this vitamin. It is also found in small amounts in most meats, fruits, and vegetables.

Vitamin **K** (**K_1** – phylloquinone and **K_2** – menaquinone) is necessary for proper clotting of the blood. Green leafy vegetables contain vitamin **K**.

Hence, for the most part, vitamins are obtained with food, but a few are obtained by other means. For example, microorganisms in the intestine – commonly known as "gut flora" – produce vitamins **K** and **B_7** (biotin), while one form of vitamin **D** is synthesized in the skin with the help of the natural ultraviolet waves of sunlight.

Deficiencies of vitamins are classified as either primary or secondary. A *primary deficiency* occurs when an organism does not get enough of the vitamin from its food. A *secondary deficiency* may be due to an underlying disorder that prevents or limits the absorption or use of the vitamin due to a "lifestyle factor", such as smoking, excessive alcohol consumption, or the use of medications that interfere with the absorption or use of the vitamin. People who eat a varied diet are unlikely to develop a severe primary vitamin deficiency. In contrast, restrictive diets have the potential to cause prolonged vitamin deficiency, which may result in often painful and potentially deadly diseases, such as *scurvy* (vitamin **C** deficit), *rickets* (vitamin **D** deficit), *anaemia* (vitamin **B_6** dificit) and others.

Avitaminosis is any disease caused by chronic or long-term vitamin deficiency or caused by a defect in metabolic conversion, such as tryptophan to niacin. Conversely hypervitaminosis is the syndrome caused by over-retention of fat-soluble vitamins in the body.

III. Answer the following questions.

1. *What is vitamin?* 2. *Why do people need vitamins?* 3. *Is there any difference between water-soluble and fat-soluble vitamins? Enumerate them.* 4. *How are the vitamins synthesized?* 5. Where *can the vitamins be found?* 6. *Which vitamins are necessary for: healthy nervous system/healthy immune system/healthy skin, bones, vision/healthy pregnancy?* 7. *What influences the absorption or use of the vitamins?* 8. *How do we understand "deficiency diseases"?* 9. *What diet is thought to be healthy?*

IV. Translate into English.

1. Вітаміни – органічні сполуки різної хімічної природи, необхідні в невеликих кількостях для нормального обміну речовин і життєдіяльності живих організмів.
2. Багато вітамінів є попередниками коферментів, які беруть участь у ферментативних реакціях.
3. Людина і тварини не синтезують вітаміни або синтезують у недостатній кількості, тому повинні одержувати їх з їжею.
4. Нестача вітамінів призводить до порушення обміну речовин. Джерелом вітамінів найчастіше є рослини.
5. За нормального раціону і зорового способу життя потреба у вітамінах задовольняється природним шляхом.
6. Однак узимку і навесні відчувається нестача вітамінів, що спричинює гіповітамінози. Надлишок вітамінів – гіпервітаміноз буває дуже рідко.

7. Одноманітне харчування, бідне на натуральні рослинні продукти, призводить до авітамінозу.
8. Фолієва кислота — вітамін **B_9**, що впливає на кровотворення, стимулює утворення еритроцитів й лейкоцитів, знижує вміст холестерину в крові. При авітамінозі розвивається недокрів'я.
9. Добова потреба людини в аскорбіновій кислоті досить велика – 63-105 мг. Нестача аскорбінової кислоти може привести до цинги.

Вітамін А і каротин мають чудову властивість накопичуватися в організмі, і їх надлишки можуть зберігатися більше року.

V. Complete the sentences by choosing appropriate words or expressions from the box. Translate the completed sentences into Ukrainian.

niacin	***fortified***	***avitaminosis***	***vitamin C***	***diarrhea***
water-soluble	***deficiency***	***visual***	***supply***	***antioxidant***

1. In much of the developed world, vitamin deficiencies are rare; this is due to an adequate ____ of food and the addition of vitamins and minerals to common foods, often called fortification.
2. The **B** vitamins are a group of ____ vitamins that play important roles in cell metabolism.
3. Human bodily stores for different vitamins vary widely; vitamins **A**, **D**, and **B_{12}** are stored in significant amounts in the human body, mainly in the liver, and an adult human's diet may be deficient in vitamins **A** and **D** for many months and **B_{12}** in some cases for years, before developing a ____ condition.
4. However, vitamin **B_3** (____ and niacinamide) is not stored in the human body in significant amounts, so stores may last only a couple of weeks.
5. An increase in the proportion of animal protein in the 20th century American diet coupled with increased consumption of milk ____ with relatively small quantities of vitamin **D**.
6. In living organisms, ascorbate is an ____, since it protects the body against oxidative stress.
7. Scurvy is an ____ resulting from lack of vitamin **C**, since without this vitamin, the synthesised collagen is too unstable to perform its function.
8. A 1992 study found that taking 2 g of ____ daily lowered blood histamine levels by 38 per cent in healthy adults in just one week.
9. When taken in large doses, ascorbic acid causes ____ and other forms of indigestion in healthy subjects.
10. The role of vitamin **A** in the ____ cycle is specifically related to the retinal form.

VI. Match the following terms with their definition.

1	**deficiency**	*a*	any of various organic substances that are essential in minute quantities to the nutrition of most people, animals and some plants
2	**cod liver oil**	*b*	a condition in which the blood is deficient in red blood cells or in haemoglobin
3	**starch**	*c*	a molecule capable of inhibiting the oxidation of other molecules
4	**anaemia**	*d*	a limitation on the use or enjoyment of property or a facility
5	**gut flora**	*e*	a deficiency disease that affects the young during the period of skeletal growth, is characterized especially by soft and deformed bones
6	**restriction**	*f*	a shortage of substances necessary for health
7	**vitamin**	*g*	microorganisms that live in the digestive tracts
8	**scurvy**	*h*	a white odourless tasteless granular or powdery complex

			carbohydrate in plants
9	**rickets**	*i*	a nutritional supplement derived from liver of cod fish with high levels of the omega-3 fatty acids, vitamins **A** and **D**
10	**antioxidant**	*j*	a disease characterized by spongy gums, loosening of the teeth, and a bleeding into the skin and mucous membranes

Контрольна робота 112

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

WHAT IS A GAS?

Gases appear to us as material of very low density that must be enclosed to keep together. Unlike solids, gases have no definite shape. Unlike liquids, gases have no definite volume, but they completely fill a container. The volume of the container is the volume of the gas in it. A gas exerts a pressure on all sides of the container that holds it. Gas can be compressed by pressures greater than the pressure the gas on its container. The words vapor, fume, air, or miasma also describe a gas. Air describes the common mixture of gases in the atmosphere. A miasma is usually a bad-smelling or poisonous gas. The words vapor and fume suggest that the gas came from a particular liquid.

In the gaseous state matter is made of particles (atoms or molecules) that are not attached to each other. The intermolecular or interatomic forces that hold solids and liquids have been overcome by the motion of the molecules. The particles of a gas have too much thermal energy to stay attached to each other. The motion and vibration of the atoms pull the individual molecules apart from each other.

Liquid air (with all of the molecules touching each other) has a density of 0.875 grams per milliliter. By Avogadro's law, a mol of any gas occupies 22.4 liters at standard temperature and pressure (STP).

1 mol of any gas at STP = 22.4 liters

Air in the gas phase at standard temperature and pressure (1 atmosphere of pressure and 0°C.) has a mol of it (28.96 g) in 22.4 liters, coming to about 1.29 grams per liter. Liquid air is over 680 times denser than the air at one atmosphere. As an estimate, each molecule of gas in the air has 680 times its own volume to rattle around in. Gases are mostly unoccupied space. Each molecule of a gas can travel for a long distance before it encounters another molecule. We can think of a gas as having a 'point source of mass', that is, the volume of the molecule is negligible compared to the space it occupies.

When a gas molecule hits another one, they bounce off each other, ideally in a completely elastic encounter. There is pressure within the gas that is caused by the gas molecules in motion striking each other and anything else in the gas. The pressure that a gas exerts on its container comes from the molecules of gas hitting the inside of the container and bouncing off.

There are some materials that do not appear in the form of a gas because the amount of molecular motion necessary to pull a molecule away from its neighbors is enough to pull the molecule apart. For this reason you are not likely to see large biological molecules such as proteins, fats, or DNA in the form of a gas.

The six noble gases are found in group 18 of the periodic table. These elements were considered to be inert gases until the 1960's, because their oxidation number of 0 prevents the noble gases from forming compounds readily. All noble gases have the maximum number of electrons possible in their outer shell (2 for Helium, 8 for all others), making them stable.

- Helium
- Neon
- Argon
- Krypton
- Xenon
- Radon

Pure gases can take several different forms. They might be made up of individual atoms, such as neon, atomic gases or noble gases. Oxygen is also a pure gas because it is made of one type of item; however, it is an elemental molecule.

Pure gases may also be compound molecules, which are comprised of a bunch of different atoms. For example, carbon dioxide would be considered a pure gas but it is also a compound molecule.
Mixed gases, on the other hand, consist of more than one kind of pure gas. In the Earth's atmosphere, for example, there are a wide mix of different gases including oxygen and other atoms that are released.

II. Complete the sentences in the text by choosing appropriate prepositions. Translate the completed text into Ukrainian.

Vitamins are classified ***by/with*** their biological and chemical activity, not their structure. Thus, each "vitamin" refers ***to/on*** a number ***in/of*** vitamer compounds that all show the biological activity associated ***by/with*** a particular vitamin. Such a set ***of/in*** chemicals is grouped ***under/above*** an alphabetized vitamin "generic descriptor" title, such as "vitamin **A**", which includes the compounds retinal, retinol, and four known carotenoids. Vitamers ***by/with*** definition are convertible ***for/to*** the active form ***of/for*** the vitamin ***in/at*** the body, and are sometimes inter-convertible ***to/for*** one another, as well.

Until/after the mid-1930s, when the first commercial yeast-extract and semi-synthetic vitamin C supplement tablets were sold, vitamins were obtained solely through food intake. Therefore changes ***at/in*** diet (which, for example, could occur ***during/before*** a particular growing season) could alter the types and amounts ***of/in*** vitamins ingested. Vitamins have been produced as commodity chemicals and made widely available as inexpensive semisynthetic and synthetic-source multivitamin dietary supplements ***since/after*** the middle of the 20th century.
The term *vitamin* was derived ***from/out*** "vitamine", a compound word made up ***by/with*** Polish scientist Casimir Funk ***out/from*** *vital* and *amine,* meaning amine ***of/for*** life. It had been suggested ***in/at*** 1912 that the organic micronutrient food factors that prevent beriberi and perhaps other similar dietary-deficiency diseases might be chemical amines. This proved incorrect ***for/to*** the micronutrient class. ***In/on*** 1920, Jack Cecil Drummond proposed that the final "e" be dropped to deemphasize the "amine" reference, after researchers began to suspect that not all "vitamines" (***in/at*** particular, vitamin **A)** has an amine component. So the word "vitamine" was shortened ***to/by*** vitamin.

III. Choose the proper continuation on the right.

1	Vitamins regulate chemical reactions by which	*a*	*over-retention of fat-soluble vitamins in the body.*
2	Vitamins are essential nutrients for the healthy maintenance of the cells, tissues, and organs	*b*	*are more likely to accumulate in the body and even cause hypervitaminosis.*
3	Water-soluble vitamins dissolve easily in water, are readily excreted from the body with the urine,	*c*	*so they are not stored and need consistent daily intake.*
4	Fat-soluble vitamins are absorbed through the intestinal tract with the help of lipids and	*d*	*the body converts food into energy and living tissues.*
5	The nutrients during pregnancy facilitate the chemical reactions that	*e*	*that make up a multicellular organism.*
6	A secondary deficiency may be due to an underlying disorder that	*f*	*prevents or limits the absorption or use of the vitamins.*
7	Restrictive diets have the potential to cause prolonged vitamin deficiency,	*g*	*which may result in lots of dangerous diseases.*

8	Avitaminosis is any disease caused by chronic or long-term vitamin deficiency	*h*	*or caused by a defect in metabolic conversion.*
9	Hypervitaminosis is the syndrome caused by	*i*	*produce skin, bones, muscles and other vital tissues and organs.*

IV. Fill in the gaps with the correct modal verbs.

1. He made a conclusion that "natural" food such as milk _____ therefore contain, besides the known principal ingredients, small quantities of unknown substances essential to life."
2. Milk sugar (lactose) _____ contain small amounts of vitamin B.
3. Diseases _____ result from some dietary deficiencies.
4. Even minor deficiencies _____ cause permanent damage.
5. Humans _____ consume vitamins periodically but with differing schedules to avoid deficiency.
6. An adult human's diet _____ be deficient in vitamins A and D for many months and B_{12} in some cases for years before developing a deficiency condition.
7. The doses of vitamins differ because individual tolerances _____ vary widely and appear to be related to age and state of health.
8. In some cases vitamin supplements _____ have unwanted effects especially if taken before surgery with other dietary supplements or medicines.
9. Dietary supplements _____ also contain levels of vitamins many times higher and in different forms than those ingested with food.
10. You _____ usually get all your vitamins from the foods you eat.
11. People who eat a vegetarian diet _____ need to take a vitamin B_{12} supplement.
12. Your body _____ also make vitamins D and K.
13. If you don't get enough vitamin D, you _____ develop rickets.
    A man was slightly injured in the accident but he _____ to go to hospital.

V. Give your friend recommendations on diet and vitamin supplements taking into account he/she is suffering one of the following diseases: anaemia, poor vision, frequent fractures, bad teeth, rickets or osteomalacia, frequent infections and others. Substantiate your recommendations.

VI. Read the text about scurvy and translate it.

Scurvy

Scurvy is a disease resulting from a deficiency of vitamin C, which is required for the synthesis of collagen in humans.

Scurvy was at one time common among sailors, pirates and others aboard ships at sea longer than perishable fruits and vegetables could be stored. It was described by Hippocrates (460 BC-380 BC), and herbal cures for scurvy have been known in many native cultures since prehistory. Scurvy was one of the limiting factors of marine travel, often killing large numbers of the passengers and crew on long-distance voyages. This became a significant issue in Europe from the beginning of the modern era in the Age of Discovery in the 15th century, continuing to play a significant role through World War I in the 20th century.

Today scurvy is known to be caused by a nutritional deficiency, but until the isolation of vitamin C and its direct link to scurvy in 1932, numerous theories and treatments were proposed, often on little or no experimental data.

In modern Western societies, scurvy is rarely present in adults, although infants and elderly people are affected. Vitamin C is destroyed by the process of pasteurization, so babies fed with ordinary bottled milk sometimes suffer from scurvy if they are not provided with adequate vitamin supplements. Virtually all commercially available baby formulas contain added vitamin C for this reason, but heat and storage destroy vitamin C. Human breast milk contains sufficient vitamin C, if the mother has an adequate intake.

Early symptoms are malaise and lethargy. After 1-3 months, patients develop shortness of breath and bone pain. Myalgias may occur because of reduced carnitine production. Other symptoms include skin changes with roughness, easy bruising and petechiae, gum disease, loosening of teeth, poor wound healing, and emotional changes. Dry mouth and dry eyes may occur. In the late stages, jaundice, generalized oedema, oliguria, neuropathy, fever, and convulsions, and eventual death are frequently seen.

Scurvy can be prevented by a diet that includes certain citrus fruits such as oranges or lemons. Other sources rich in vitamin C are fruits such as black currants, kiwifruit, papaya, tomatoes, and strawberries. It can also be found in some vegetables, such as carrots, broccoli, potatoes, cabbage, spinach and paprika. Some animal products, including liver and oysters, contain vitamin C.

Scurvy does not occur in most animals because they can synthesize their own vitamin C. However, humans and other higher primates, guinea pigs, most or all bats, and some species of birds and fish lack an enzyme necessary for such synthesis and must obtain vitamin C through their diet.

Контрольна робота 113

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

METRIC SYSTEM vs. "ENGLISH SYSTEM"

The metric system typically uses only one root word for any basic dimension such as for length, the meter. All the metric units of length use the root word 'meter' with the metric prefixes in the next table. Our common system in the United States is not really a system, but is a thrown-together mess of measurements with no overriding order. Chemtutor, as does most of the United States, calls this group of measurements the "English" system. While calling it that is a considerable slander on the English people, the United States and Liberia are the only nations on earth to still cling to it. Chemtutor thinks that the English system makes a fine learning tool, along with being wonderfully poetic. You will want to know how to relate the English System to the metric system. Particularly notice the large number of units of length in the English system. This is only a small number of the common ones. We regularly use fathoms to measure depth in water and furlongs to measure distance in horse racing. There are many little-used English length units such as the barleycorn (one third of an inch) that may be picturesque, but are not used today. Notice that we define the barleycorn as a third of an inch. The way to relate one English unit to another is by definition. Length is the most common measurement. As a result, it has not only the largest number of words to describe it, but it also has the largest number of symbols to represent it in formulas. The English language also uses distance, long, width, height, radius, displacement, offset, and other words for length, sometimes in specialized applications.

Here are some differences between the "English System" and the Metric System, or SI.
The Metric System (usually) uses only one root word for each basic dimension, such as "-gram" for mass or "-meter" for distance. Some dimensions have more than one root word, such as "-liter" for volume instead of the cubic distance (such as "cubic centimeter"). The English System has a diffenent name for each measurement unit, such as inch, foot, yard, etc.
The Metric System uses metric prefixes before the root word to indicate the magnitude of the measurement, such as kilogram or microgram.
The Metric System units are arranged in powers of ten, according to their metric prefixes. One centimeter is equal to ten millimeters. The English System uses any traditional definition with any number. One foot equals twelve inches, or one yard equals three feet. Even More disturbing, the English System uses FRACTIONS of units, such as 3/8 inch or mixed units, such as pounds and ounces or feet and inches.
The Metric System uses the idea of MASS for measuring the amount of material rather than WEIGHT. The English System uses the POUND as a unit of weight, even though it is also a unit of force.
The great majority of the world uses the Metric System. The US is now SLOWLY beginning to convert to the Metric System. We see liters of drinks in the grocery stores. Our medicines are in grams or milligrams. Our food labels show Metric units.
LENGTH
A meter is a little longer than a yard, so a meterstick that has inches on the back of it will has just a bit over thirty-nine inches on the English side. Typically, on the English side, the inches are broken into halves, fourths, eighths, and perhaps sixteenths. On the metric side one meter breaks down into ten decimeters, one hundred centimeters, and a thousand millimeters.
AREA
An area is a length multiplied by a length. (A= l l as in the formula list.) An area is an amount of surface. Almost all area units are length units squared, such as: square meter (m^2), square centimeter (cm^2), square inch (in^2), etc. The acre and hectare, units of land measurement, are the only units commonly used that are not in the "distance squared" area unit format. An acre is

defined as 43,560 square feet, so in using the unit 'acre' in dimensional analysis, the definition can be used to relate the acre to other units. Notice the squaring of a unit of length. A meter multiplied by a meter is a square meter. A foot by a foot is a square foot, etc.

VOLUME

Volume is length multiplied by length multiplied by length. You may have heard that volume is length times height times width, but it means the same thing. (V= l l l) You may think of a volume as the space inside a rectangular (block-shaped) fish tank. Volume is the measure of an amount of space in three dimensions. Because volume is such a common type of measurement, it is unique in that it has two types of commonly used root word in both metric and English systems. The metric roots are liter (L) and cubic meter (m^3). The English system also uses cubic length, such as cubic feet (ft^3) and an extensive array of units that are not in the cubed length format, such as teaspoons, tablespoons, cups, pints, quarts, and gallons. Again, analogously to area measurements, a cubic meter is a meter multiplied by a meter multiplied by a meter, and a cubic foot is a foot by a foot by a foot.

II. Read the text about the history of vitamins discovery and answer the questions.

1. What did the Scottish surgeon James Lind discover?
2. What was the correlation of vitamins **A** and **D** in their "antirachitic properties"?
3. What conclusion did Russian surgeon Nikolai Lunin make concerning "small quantities of unknown substances essential to life"?

History of Vitamins Discovery

The value of eating a certain food to maintain health was recognized long before vitamins were identified. The ancient Egyptians knew that feeding liver to a patient would help cure night blindness, an illness now known to be caused by a vitamin A deficiency. The advancement of ocean voyages during the Renaissance resulted in prolonged periods without access to fresh fruits and vegetables, and made illnesses from vitamin deficiency common among ships' crews.

In 1749, the Scottish surgeon James Lind discovered that citrus foods helped prevent scurvy, a particularly deadly disease in which collagen is not properly formed, causing poor wound healing, bleeding of the gums, severe pain, and death. In 1753, Lind published his ***Treatise on the Scurvy***, which recommended using lemons and limes to avoid scurvy, which was adopted by the British Royal Navy.

During the late 18^{th} and early 19^{th} centuries, the use of deprivation studies allowed scientists to isolate and identify a number of vitamins. Lipid from fish oil was used to cure rickets in rats, and the fat-soluble nutrient was called "antirachitic **A**". Thus, the first "vitamin" bioactivity ever isolated, which cured rickets, was initially called "vitamin **A**"; however, the bioactivity of this compound is now called vitamin D. In 1881, Russian surgeon Nikolai Lunin studied the effects of scurvy while at the University of Tartu in present-day Estonia. He fed mice an artificial mixture of all the separate constituents of milk known at that time, namely the proteins, fats, carbohydrates, and salts. The mice that received only the individual constituents died, while the mice fed by milk itself developed normally. He made a conclusion that "a natural food such as milk must therefore contain, besides these known principal ingredients, small quantities of unknown substances essential to life". However, his conclusions were rejected by other researchers when they were unable to reproduce his results. One difference was that he had used table sugar (sucrose), while other researchers had used milk sugar (lactose) that still contained small amounts of vitamin B.

In Eastern Asia, where polished white rice was the common staple food of the middle class, beriberi resulting from lack of vitamin $\mathbf{B_1}$ was endemic. In 1884, Takaki Kanehiro, a British

trained medical doctor of the Imperial Japanese Navy, observed that beriberi was endemic among low-ranking crew who often ate nothing but rice, but not among officers who consumed a Western-style diet. With the support of the Japanese navy, he experimented by using crews of two battleships – one crew was fed only white rice, while the other was fed a diet of meat, fish, barley, rice, and beans. The group that ate only white rice documented 161 crew members with beriberi and 25 deaths, while the latter group had only 14 cases of beriberi and no deaths. This convinced Takaki and the Japanese Navy that diet was the cause of beriberi, but mistakenly believed that sufficient amounts of protein prevented it. Those diseases could result from some dietary deficiencies. That was further investigated by Christiaan Eijkman, who in 1897 discovered that feeding unpolished rice instead of the polished variety to chickens helped to prevent beriberi in the chickens. The following year, Frederick Hopkins postulated that some foods contained "accessory factor" – in addition to proteins, carbohydrates, fats, etc. – that are necessary for the functions of the human body. Hopkins and Eijkman were awarded the Nobel Prize for Physiology or Medicine in 1929 for their discovery of several vitamins.

In 1931, Albert Szent-Györgyi and a fellow researcher Joseph Svirbely suspected that "hexuronic acid" was actually vitamin C, and gave a sample to Charles Glen King, who proved its anti-scorbutic activity in his long-established guinea pig scorbutic assay. In 1937, Szent-Györgyi was awarded the Nobel Prize in Physiology or Medicine for his discovery. In 1943, Edward Adelbert Doisy and Henrik Dam were awarded the Nobel Prize in Physiology or Medicine for their discovery of vitamin K and its chemical structure. In 1967, George Wald was awarded the Nobel Prize (along with Ragnar Granit and Haldan Keffer Hartline) for his discovery that vitamin **A** could participate directly in a physiological process.

III. Read the following text, translate it and answer the questions.

- Is obesity a choice or an illness?
- Do you think fast food should be limited like cigarettes (for example health warning, high price, special places for eating, etc.)?
- Should overweight people pay more for health care, plane tickets, etc.?

In 2003, American film maker Morgan Spurlock made a film about the effects of eating only hamburgers, pizzas, and fries for a month. The idea came to him when two overweight American girls took legal action against a famous fast-food company. The girls accused the company of making them fat. The company said that it was not the food that made them fat, but eating too much. The company also said their food was "nutritious and good for you".

The girl's legal action failed, but Morgan Spurlock decided to test what the company said about their food. For a month he ate only fast food, three times a day, and took the daily exercise of an average American. He filmed himself during this month and the film he made records the changes that happened to him.

When Spurlock started making the fim, he was healthy and slim. On the second day, he had his first "fast-food stomach ache", and vomited. Over the following thirty days, he gained 24.5 Ib (11.1 kg). He also had other problems – depression, headaches, and lethargy. He had cravings for a fast-food meal – only this would relieve the symptoms. A doctor told Spurlock he was addicted.

Towards the end of the month, doctors warned him that the food was causing life-threatening liver damage, and said he should stop. It took five months on a vegetarian diet to get back to a normal weight.

The film he made is called *Super size me*. It was nominated for an Academy Award for best documentary in 2005. The film's message was that the fast-food industry was probably as bad as the tobacco industry – it made a lot of money by encouraging illness.

IV. Discuss what encouragement you would give to a patient who is trying to lose weight. You might want to talk about:

- foods to avoid: fatty foods, salt/sugar, crisps, biscuits, cakes, etc.;
- fibre;
- white meat vs red meat;
- dairy products: skimmed milk/semi-skimmed milk;
- ways of cooking: grilling, steaming, poaching, baking, using vegetable oil, not frying;
- snacking;
- 5 portions and preferably more fruit and vegetables a day;
- (oily) fish 2/3 times a week;
- drink 2-4 litres fluid, i.e. water, not tea/alcohol.

V. Fill in the gaps with the appropriate modal verbs combined with the correct tense form.

1. Vitamin B_3 is not stored in the human body in significant amounts, so stores _____ _____ *(may, to last)* only a couple of weeks.
2. She was so tired after visiting the doctor. She _____ _____ for a week *(could, to sleep)*.
3. Vitamin B_{12} is the only water-soluble vitamin that _____ _____ *(can, to store)* in the liver for many years.
4. I wonder why Mary didn't answer the phone. She _____ _____ asleep *(may, to be)*.
5. Not eating enough fruits, vegetables, beans, lentils, whole grains and fortified dairy foods _____ _____ *(may, to increase)* your risk for health problems, including heart disease, cancer, and poor bone health.
6. There _____ not _____ *(might, to be)* a meeting on Friday because the director is ill.
7. Vitamins A, D, E, K are stored in fat cells, they _____ _____ *(can, to build up)* in your body and _____ _____ *(may, to cause)* harmful effects.
8. Julia wears glasses. She _____ _____ *(have to, to wear)* glasses since she was very young.
9. You _____ _____ (must, to keep) a secret. You _____ _____ *(must not, to tell)* anybody else.
10. Excuse me, _____ you _____ *(could, to tell)* me how to find these vitamins.
11. It _____ never _____ *(might, to happen)* if you'd sent him to a real doctor when he first got sick.
12. He _____ _____ *(have to, to go)* to hospital last week.
13. However, high doses of some vitamins _____ _____ *(can, to make)* you sick.
14. In some cases, you _____ _____ *(may, to need)* to take a daily multivitamin for optimal health.

    Last night Don became ill suddenly. We _____ _____ *(have to, to call)* a doctor.

Контрольна робота 114

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

MEASUREMENTS

TIME

Time is also a bit odd in its units. In both systems the units of less than a second are in the metric style with prefixes before the second, such as millisecond. Time units of more than a year are in a type of metric configuration because they are in multiples of ten (decades, centuries, millennia, etc). The dimension of time is messy for good reason. The more commonly used time units from day to year are all dependent upon the movement of the earth. The unit of 'month,' particularly if it is directly related to the moon, is useless as an accurate unit because it does not come out even in anything. Having sixty seconds in an hour and twenty-four hours in a day come about from the ease of producing mechanical clocks. (Is it time to switch to metric time? Consider ten hours in a day, one hundred minutes in an hour, and one hundred seconds in a minute. It would come out to almost the same length of second. I will let you do the math.)

MASS

Mass is an amount of matter. Mass has inertia, which is the tendency of matter to stay where it is if it is not moving, or to keep moving at the same rate and direction if it is already moving. You could measure mass by an inertial massometer. Visualize a metal strip held tightly on one end and "twanged," or given a push to make it vibrate on the other end. It has a natural pitch to vibrate. If you were to put a mass on the end of that strip, you would change the pitch of the vibration. The change of pitch would make it possible to calculate the mass of the added object. This measurement of mass is completely independent of gravity, the way we often weigh a mass by comparing the push or force of the mass on a surface. Mass is a more accurate way of thinking of amount of matter compared to weight. The metric system is mass-based whereas the English system thinks in weight. Consider that an astronaut in near earth orbit has no weight because the gravitational attraction cancels inertia, but the mass of the astronaut remains the same. The metric root word of mass measurement units is the gram. Notice the difference between the "root word," gram, which is the basis for adding metric prefixes, and the system base of kilogram, the mass unit of the S.I. metric system.

WEIGHT

Weight is a downward force due to the mass of an object and the acceleration of gravity. The English system can conveniently use the idea of weight to measure amount of material because there is very little difference in the acceleration of gravity over the surface of the earth. There are certainly other forces besides gravity. Magnetism produces a force. Electric charge produces a force. Like the unit of force, the English unit of weight is the pound, and the metric unit of weight is the Newton.

VELOCITY

Velocity is a complex dimension. The unit of velocity is a combination of more than one type of basic dimension. A velocity is a distance per time. The word 'per' here means 'divided by,' and distance divided by time is not only the definition of velocity, but it is the easy way to remember the velocity formula, $v = d/t$. Velocity also has the name of rate. You might know the same formula as, "rate times time equals distance." Here's where we could start complicating the math by using calculus, but we won't. If you are taking a course that requires calculus, the math is only slightly different, but the basic ideas behind it are the same.

PRESSURE

A pressure is a force per area. You can almost see the pressure of the wind on a sail. The pressure of the wind is the same, so the larger the area of the sail, the greater the force of the wind on the ship. Pressure unit definitions that we need for this course revolve around the unit "atmosphere" because historically the pressure was first measured for weather.

DENSITY

Density is mass per volume, weight per volume, or specific gravity, which is the density of a material per the density of water. Metric system densities are usually in the units of mass per volume, such as $kg/_{L}$ (kilogram per liter) or $g/_{cm^3}$ (gram per cubic centimeter). English densities are usually in weight per volume, such as $\#/_{gal}$. (pounds per gallon) or $\#/_{ft}3$ (pound per cubic foot). Specific gravity has no units (!) because it is a comparative measurement. Specific gravity is the density of a material compared to the density of water. Expressing density as specific gravity shows neither system.

We can have fun in a density demonstration by passing a large-grapefruit-sized ball of lead around the class. That size of lead ball weighs about 35 pounds. People do not expect something that compact to weigh so much. One way to think of density is, "How much mass is packed into a volume."

TEMPERATURE

Temperature is a bit more subtle dimension. What we really measure is the average velocity of the atoms or molecules in the material. One way to measure it is by the expansion of a liquid in a very small tube. This is the shape of a liquid (usually mercury or alcohol) in a thermometer. The Fahrenheit scale is still not a bad one for use with weather. Scientists are more likely to use the Celsius or Centigrade scale. Gas law calculations require the Kelvin scale because it is an absolute scale. The other absolute scale, Rankine (pronounced "rank-in"), is useful for teaching purposes, but is not in common use.

ENERGY

Energy is the ability to do work. A Joule, the metric unit of energy is a kilogram- meter- square-per- second- square. Both of those ideas can be difficult to wrap your mind around. The easier way to think of energy is perhaps by its various types. You should have an intuitive feeling that a fifty pound rock held above your head has more energy of position in a gravitational field than the same fifty pound rock by your feet. A rubber band pulled back has more spring energy than a lax one. A speeding train has more energy of movement than a still one. We usually value petroleum not for its beauty, but for its chemical energy content. Energy is transferable from one type to another, but is not lost or gained in changes.

HEAT

Heat is a form of energy. It is the energy of the motion of molecules. Even though heat and energy are fundamentally the same dimension, we measure and calculate them differently. We define a calorie (note the lower-case 'c') as the amount of heat that increases the temperature of a gram of liquid water one degree C. The BTU, the English unit of heat, is the amount of heat that increases the temperature of a pound of liquid water one degree F. A food Calorie (note upper case 'C') is one thousand heat calories of usable food energy. That is, the food Calorie reflects the type of living thing eating AND USING the energy. So the food Calorie depends on the type of (animal) eating it. A cow or a termite could get much more food value from a head of lettuce than a human being can, so what is a Calorie for us would be different for them.

CONCENTRATION

Concentration is amount of material in a volume. In this course, we will stay mostly with measuring the amount of solute in a solution. There is more on this in the chapter on solutions, and we really need to explain the idea of mol or mole before a thorough explanation of concentration can mean much.

Notice the formulas in the table below. Some of the simple ones we use in this course only for practice with problem-solving techniques and for defining the units and dimensions. There are a few items in the formulas that have not been mentioned yet, such as c, the specific heat; n, the number of mols; and R, the universal gas constant. These we will consider in context as we use them.

II. Translate the sentences into English using modal verbs.

1. Якщо ви не турбуватиметесь про себе, ви можете мати нервове виснаження і будете змушені лягти в лікарню.
2. Ви не можете увійти. Ви не повинні захворіти на ту ж хворобу, що і я.
3. Ви повинні приймати по столовій ложці цієї суміші три рази на день.
4. Що ви можете порекомендувати людині, у якої сильний головний біль?
5. Він був таким слабким, що не міг підняти голову.
6. Я не вірю, що є хвороби, які не можна вилікувати. Ми просто не знаємо, як їх лікувати.
7. Я думаю, він, можливо, не знає всіх деталей, але основна ідея йому ясна.
8. Ви повинні приймати ці ліки регулярно.
9. Моя мама почувалася погано, і я повинна була піти в аптеку.
10. Вона повинна часто ходити до стоматолога.
11. Невже щось трапилось там, що затримало її?
12. Він запитав лікаря, чи можна скористатися його телефоном.
13. Вона, напевно, застудилася.

Він сказав, що вона повинна порадитися з лікарем.

III. Read and translate the text

Nutrition

Proper nutrition involves a diet that includes a balance of macronutrients (carbohydrates, proteins, and fats), and micronutrients (essential vitamins and minerals). Adults should consume 2 or 3 servings daily of foods from the meat, poultry, beans, eggs, and nuts group. These foods are an excellent source of protein, iron and B vitamins. Beans, skinless poultry, lean red meat, and baked, broiled or grilled fish are excellent low-fat selections from the **protein group**. **Fats** are necessary for the absorption of the fat-soluble vitamins A, D, E, and K. Fats also provide essential fatty acids, required for many chemical and hormonal processes in the body. Dieticians suggest that adults should consume between 6 and 11 servings daily from the bread, cereal, rice, and pasta group. This food group provides **carbohydrates**, protein, dietary fibre, B vitamins, and minerals. Good sources include whole grains, legumes, lentils, and whole grain cereals. Foods from the **fruit and vegetable group** are generally low in fat and salt and contain ample amounts of vitamins, minerals, and dietary fibre. Adults should consume 2 or 4 servings of fruit daily, preferably fresh rather than canned. Vegetables should make up roughly 3 to 5 daily servings and are best when fresh or fresh-frozen. Overcooking vegetables can destroy nutrients – lightly steaming vegetables is an excellent way to preserve essential vitamins and minerals while retaining flavour. **Dairy** group should make up 2 or 3 servings per day. Foods in this category are sources of protein, calcium and other minerals and vitamins. However, dairy products can be a source of saturated fats. To reduce saturated fat intake, try to consume milk and low-fat dairy products. **Water** makes up approximately 60 per cent of our bodies and is essential to life. Adults should drink eight glasses of water each day, and very active people should drink even more.

Vegetarianism. There are several types of vegetarian diets, including ***lacto-ovo-vegetarian***, in which a person consumes milk products and eggs as well as plant-based foods, and ***veganism***, in which a person avoids all animal products. A vegetarian diet is often better balanced than a diet that includes meat. Vegetables, grains, and legumes, which tend to form the basis of a healthy vegetarian diet, are naturally low in fat and high in fibre. Evidence suggests that vegetarians tend to be less obese and are less likely to develop heart disease, high blood pressure, type 2 diabetes, and alcoholism. For children and women who are pregnant or nursing,

a vegetarian diet can be maintained, but special care should be taken to ensure that the diet provides enough proteins and nutrients. Vegans are at risk of developing a deficiency of vitamin B12, which can be found only in animal sources. Thus, people who follow a vegan diet should take a vitamin B12 supplement.

Macrobiotics is a combination of diet and lifestyle that integrates awareness of the whole person, responsiveness to the environment, and ancient Chinese philosophies. A macrobiotic diet varies from person to person, but its basic emphasis is on eating locally grown, seasonal, organic foods in certain proportions. In general, the balance of foods consumed in a macrobiotic diet consists of about 50 to 60 per cent whole grains, 25 to 30 percent fresh vegetables, especially greens, 5 to 10 per cent legumes and seaweeds, and 5 to 10 per cent soy- and vegetable-based soups. Like a vegetarian diet, a macrobiotic diet is high in fibre and low in fat, a combination associated with decreased risk of heart disease and cancer. The main danger of a strict macrobiotic diet is that it may not provide enough essential vitamins and nutrients. Some studies have found that children raised on a macrobiotic diet have slowed growth and development.

Fasting and Detoxification. Some alternative therapies attempt to treat ailments by removing foods from the diet in an attempt to detoxify the body. People are exposed to a number of toxic substances in the course of modern living, and periodic fasting or alteration of the diet can help the body eliminate these toxins, promote overall health, and prevent various ailments. Often, detoxification consists of a series of several 2-to-3-day fasts, during which only water or only fresh vegetable juices are consumed. In other cases, a diet of fresh, organic, unprocessed foods may be followed for a period of several weeks to several months. During and following detoxification, a person should avoid processed foods, refined sugars, alcohol, and caffeine. The benefits of detoxification are not clinically proven. Infrequent fasts of a couple of days are generally safe for people in good health, but prolonged or repeated fasting may lead to a nutrient deficiency and thus cause illness.

IV. Find synonyms in the boxes on the right to the word in italics.

serving	tinned	to hold
canned	to try	disorder
ample	appropriate	to modify
ailment	sufficient	helping
prolonged	indispensable	preserved
to attempt	to alter	to make better
proper	disease	permanent
essential	intake	to heal
to suggest	to contain	to strive
to improve	to excrete	supplement
consumption	impairment	suitable
to retain	continuous	to remove
lean	lack	to recommend
flavour	to cure	injury
to ensure	to initiate	ingestion
to eliminate	severe	abundant
addition	to assure	scanty
to change	to propose	to reduce

strict	additive	to cause
to decrease	aroma	to guarantee
to treat	portion	necessary
deficiency	to amend	insufficiency
to trigger	to diminish	austere
damage	thin	odour

V. Match the method of cooking with its definition.

1	cooking in steam, used for puddings, fish, etc.	*a*	**baking**
2	the term used in meat cookery by which the meat is first browned, then has a small quantity of water added	*b*	**boiling**
3	cooking meat or fruit in a small amount of water and its own juices	*c*	**braising**
4	cooking foods in enough water to cover them, at a temperature lower than 100ºC	*d*	**frying**
5	cooking in fat; used for chips, doughnuts, etc.	*e*	**roasting**
6	the food is placed in the oven; used for preparing cakes, breads	*f*	**simmering**
7	is done by placing the food in the oven or over coals and cooking until it is tender; used for cooking meats	*g*	**steaming**
8	cooking foods in enough water to cover them, at 100ºC	*h*	**stewing**

VI. Find the opposites in the text to the following words.

insufficient	
to excrete	
disadvantage	
to decrease	
mild	
to worsen	
dangerous	
to inhibit	
frequent	
temporary	
fatty	

VII. Answer the following questions.

1. *What does a balanced nutrition imply?* 2. *What belongs to macronutrients and micronutrients?* 3. *How much carbohydrates, proteins and fats should a person consume per day?* 4. *Why is water essential to life?* 5. *What are advantages and disadvantages of vegetarianism?* 6. *What is the role of antioxidants?* 7. *When are fasting and detoxification beneficial?*

Контрольна робота 115

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

ATOMIC WEIGHTS AND ATOMIC NUMBERS

The integer that you find in each box of the Periodic Chart is the atomic number. The atomic number is the number of protons in the nucleus of each atom. Notice that there is one and only one integer from 1 - 110 or so in each element box, so we have found all the elements. Each element fits neatly into its niche in the Periodic Table.

Another number that you can often find in the box with the symbol of the element is usually not an integer. It is oversimplifying only a little to say that this number is the number of protons plus the average number of neutrons in that element. The number is called the atomic weight or atomic mass.

How can it be that an element must have an averaged atomic weight? The number of protons defines the type of element. If an atom has six protons, it is carbon. If it has 92 protons, it is uranium. The number of neutrons in the nucleus of an element can be different, though. Carbon 12 is the commonest type of carbon. Carbon 12 has six protons (naturally, otherwise it wouldn't be carbon) and six neutrons. The mass of the electrons is negligible. Carbon 12 has a mass of twelve. Carbon 13 has six protons and seven neutrons. Carbon 14 has six protons and eight neutrons. Carbon 14 is radioactive because, as other atoms with the wrong percentage of neutrons to protons, it is unstable. The nucleus tends to pop apart. The proper ratio of protons to neutrons is about one to one for small elements and about one proton to one and a half neutrons for the larger elements. Types of an element in which every atom has the same number of protons and the same number of neutrons are called isotopes. Carbon 14 is a radioactive isotope of carbon. Any carbon 14 that was made at the time the earth was formed is now almost all gone. Carbon 14 is continuously made from high energy electromagnetic radiation hitting nitrogen atoms in the ozone layer of the earth. This carbon 14 when taken into plants as CO2 will also be taken into animals. We can find out how much carbon 14 that normally is in a living plant or animal and from there we can find the actual amount of carbon 14 left in a plant or animal long dead. We can get a very good idea of how long ago that plant or animal was living from the amount of carbon 14 remaining in the dead body. This process is called "carbon dating." The stable, non-radioactive isotopes of carbon play no part in this. As a whole element, carbon has a more or less fixed proportion of the various carbon isotopes. For this reason, we can determine a weighted average of the isotopes for all elements. On a periodic chart you may see some atomic weights that are integers or in parentheses. These are usually on the very large or very rare or very radioactive elements. That is not really an integer atomic weight, but the atomic weight has been estimated to the nearest integer.

FORMULA WEIGHT OR MOLECULAR WEIGHT OR FORMULA MASS OR MOLAR MASS

Now with the atomic weight information we can consider matching up atoms on a mass-to-mass basis. Let's take hydrogen chloride, HCl. One hydrogen atom is attached to one chlorine atom, but they have different masses. A hydrogen atom has a mass of 1.008 AMU and a chlorine atom has a mass of 35.453 AMU. Practically speaking, one AMU is far too small a mass for us to weigh in the lab. We could weigh 1.008 grams of hydrogen and 35.453 grams of chlorine, and they would match up exactly right. There would be the same number of hydrogen atoms as chlorine atoms. They could join together to make HCl with no hydrogen or chlorine left over. If we take one gram of a material for every AMU of mass in the atoms of just one of them, we will have a mol (or mole) of that material. One mol of any material, therefore, has the same number of particles of the material named, this number being Avogadro's number, 6.022 E 23.

The formula weight is the most general term that includes atomic weight and molecular weight. In the case of the HCl, we can add the atomic weights of the elements in the compound and get a molecular weight. The molecular weight of HCl is 36.461 g/mol, the sum of the atomic weights of hydrogen and chlorine. The unit of molecular weight is grams per mol. The way to calculate the molecular weight of any formula is to add up the atomic weights of all the atoms in the formula. $CuSO4 \cdot 5H2O$ is the formula for copper II sulfate pentahydrate. The formula has one copper atom, one sulfur atom, nine oxygen atoms, and ten hydrogen atoms. To get the formula weight of this compound we would add up the atomic weights. Copper II sulfate pentahydrate is not a molecule, strictly speaking, but you will hear the term "molecular weight" used for it rather than the more proper "formula weight." Since the unit of formula weight is grams per mol, it makes good sense to use the formula weight of a material as a conversion factor between the mass of a material and the number of mols of the material.

II. Fill in the gaps with appropriate prepositions.

Nutritional science investigates the metabolic and physiological responses ___ the body ___ diet. With advances in the fields of molecular biology, biochemistry, and genetics, the study ___ nutrition is increasingly concerned ____ metabolism.

The human body contains chemical compounds, such as water, carbohydrates (sugar, starch, and fibre), amino acids (in proteins), fatty acids (in lipids), and nucleic acids (DNA and RNA). These compounds ____ turn consist ____ elements such as carbon, hydrogen, oxygen, nitrogen, phosphorus, calcium, iron, zinc, magnesium, manganese, and so on. All ___ these chemical compounds and elements occur ___ various forms and combinations (e.g., hormones, vitamins, phospholipids, hydroxyapatite), both in the human body and ____ the plant and animal organisms that humans eat.

The human body consists ___ elements and compounds ingested, digested, absorbed, and circulated through the bloodstream to feed the cells ___ the body. In a typical adult, about seven liters ___ digestive juices enter the lumen ___ the digestive tract. These break chemical bonds ____ ingested molecules, and modulate their conformations and energy states. Unabsorbed matter, along ___ some waste products ___ metabolism, is eliminated ____ the body in the faeces.

____ general, eating a wide variety ___ fresh, whole (unprocessed) foods has proven favorable compared ___ monotonous diets based ___ processed foods. ___ particular, the consumption ___ whole-plant foods slows digestion and allows better absorption, and a more favorable balance ___ essential nutrients per Calorie, resulting ___ better management ____ cell growth, maintenance, and mitosis (cell division), as well as better regulation of appetite and blood sugar.

III. Fill in the blanks with the words from the table.

absorbed amino acids amounts balanced bioavailable cellulose cereals energy fish flavour haemoglobin healing insulation, intake iodine lost minerals protect pulses starches stored undernutrition

A _____ diet contains all the necessary substances required by body cells. There can be adverse effects from overeating as well as from _____ . A varied diet is the best way to ensure an adequate _____ of all the essential nutrients. The essential nutrients are water, carbohydrate, protein, lipid, vitamins and _____ .

Carbohydrates are the main source of _____ . They comprise sugars, _____ and complex polysaccharides. Fruit and vegetables provide carbohydrate but leaves and stalks can be indigestible because they contain more _____.

The component _____ of protein are essential for structural maintenance, physiological regulation and energy supply. High quality protein which is easily digested and _____ is found in meat, eggs, milk, fish and _____ (beans, peas, lentils, etc.).

Lipids provide concentrated energy and are used by the body to store energy. They provide _____ under the skin, _____ major organs from trauma and are required for effective neural function. They give food aroma and _____, increase palatability and give a feeling of satiety.

Only small _____ of vitamins are required. Fat-soluble vitamins are absorbed from the small intestine and are found in _____ and plant oils. They can be _____ in the liver and adipose tissue. Water-soluble vitamins are easily _____ from the body. Vitamin B complex includes thiamine, and nicotinic acid. Foods providing these include _____ (wheat, rye), yeast, milk and eggs.

There are many minerals that are essential for health, but iron, _____, and zinc are the most significant. Zinc is involved in enzyme reactions and is important during periods of growth and wound _____. It is found in animal products. Iron is a major component of _____ and is important in enzyme processes and in the immune response. Iron is found in most foods but must be in _____ form.

IV. Translate into English.

1. **Раціональне харчування** – це правильно організоване і своєчасне забезпечення організму безпечною їжею; вміст у раціоні оптимальної кількості харчових речовин, необхідних для розвитку і життєдіяльності організму. Раціональне харчування забезпечує нормальну життєдіяльність організму, високий рівень стійкості до несприятливих факторів навколишнього середовища, максимальну тривалість активного життя.
2. Неправильне харчування призводить до появи багатьох захворювань внаслідок зниження захисних властивостей організму, порушує процеси обміну речовин, веде до передчасного старіння, може сприяти появі багатьох захворювань, у тому числі інфекційних, через те, що ослаблений організм чутливий до негативних впливів.
3. У природі не існує ідеальних продуктів харчування, які містили б усі харчові речовини, необхідні людині (за винятком материнського молока). Тільки різноманітні продукти харчування в раціоні забезпечують його харчову цінність, тому що різні продукти доповнюють один одного відсутніми компонентами.
4. Раціональне харчування запобігає нагромадженню радіонуклідів, сприяє їх знешкодженню та швидкому виведенню з організму, нормалізує обмін речовин. Нестача білків, вітамінів, мікроелементів веде до значного накопичення в організмі радіонуклідів. Якість харчового раціону, в значній мірі, визначається вмістом білків, жирів, вуглеводів, мінеральних речовин, вітамінів.
5. **Білки –** основа всіх клітин, вони є будівельним матеріалом, а також беруть участь в обміні речовин, у формуванні імунітету, в утворенні деяких сполук, що виконують в організмі складні функції.
6. **Жири** мають найбільшу енергетичну цінність. Вони необхідні для нормальної діяльності центральної нервової системи, для кращого засвоєння білків, мінеральних речовин, жиророзчинних вітамінів A, D, E.
7. **Вуглеводи –** значне джерело енергії, вони задовольняють 50-60% добової потреби організму в енергії. Головними постачальниками вуглеводів є продукти рослинного походження: хліб, крупи, макаронні вироби, картопля, овочі, фрукти. За хімічним складом вуглеводи поділяють на прості (глюкоза, фруктоза тощо) і складні (геміцелюлоза, крохмаль, пектини тощо).

V. Open the brackets choosing the most suitable modal verb.

1. Adults *(should/will/would/dare)* drink 8 glasses of water each day.
2. People who follow a vegan diet *(dare/would/need/will)* take a vitamin B12 supplement.
3. How *(need/dare/will/ought to)* you say that veganism is dangerous for our body?
4. *(Shall/need/dare/ought to)* I prepare a plant-based meal for dinner?
5. Physically active people *(need/will/shall/would)* consume more protein than other individuals.
6. You *(needn't, won't, wouldn't, oughtn't to)* follow a vegetarian diet if you want to be slim, just eat less fried food and drink more water.
7. A healthy diet *(should, dare, would, shall)* have a balance of fats, proteins, and carbohydrates.
8. You *(shouldn't/won't/shan't/wouldn't)* have kept to a vegan diet if you lack vitamin B12.
9. Coffee, tea, artificially-sweetened drinks, 100-percent fruit juices, low-fat milk and alcohol can fit into a healthy diet but *(will/need/should/would)* be consumed in moderation.
10. *(Shall/need/ought to/dare)* I buy pastries or you are on a diet?
11. *(Would/shall/need/dare)* I prepare food containing healthy fats?
12. *(Shall/will/need/ought to)* I enumerate you the benefits of a vegetarian diet?
13. You *(will/shall/need/would)* consume more zinc if you want your wound to be healed.
14. During and following detoxification, a person *(will/dare/should/would)* avoid alcohol and caffeine.
15. *(Will/shall/ought to/need)* you buy fresh-frozen fruit and whole grains for me, please?

VI. Read the text and answer the questions.

1. For what reasons is vegetarian diet usually pursued?
2. When did vegetarianism appear?
3. What are the types of vegetarian diet?
4. Why is it beneficial to follow this diet?

Vegetarianism

Vegetarianism encompasses the practice of following plant-based diets (fruits, vegetables, etc.), with or without the inclusion of dairy products or eggs, and with the exclusion of meat and seafood. Vegetarianism can be adopted for different reasons. In addition to ethical reasons, motivations for vegetarianism include health, religious, political, environmental, cultural, aesthetic or economic.

The earliest records of (lacto) vegetarianism come from ancient India and ancient Greece in the 6th century BC. In both instances the diet was closely connected with the idea of nonviolence towards animals and was promoted by religious groups and philosophers. In the Western world, the popularity of vegetarianism grew during the 20^{th} century as a result of nutritional, ethical, and more recently, environmental and economic concerns. There are a number of types of vegetarianism, which exclude or include various foods.

- Ovo-vegetarianism includes eggs but not dairy products.
- Lacto-vegetarianism includes dairy products but not eggs.
- Ovo-lacto-vegetarianism (or lacto-ovo-vegetarianism) includes animal/dairy products such as eggs, milk, and honey.
- Veganism excludes all animal flesh and animal products, including milk, honey, and eggs, and may also exclude any products tested on animals, or any clothing from animals.
- Raw veganism includes only fresh and uncooked fruit, nuts, seeds, and vegetables. Vegetables can only be cooked up to a certain temperature.
- Fruitarianism permits only fruit, nuts, seeds, and other plant matter that can be gathered without harming the plant.
- Buddhist vegetarianism excludes all animal products as well as vegetables in the allium family (which have the characteristic aroma of onion and garlic): onion, garlic, scallions, leeks, or shallots.
- Jain vegetarianism includes dairy but excludes eggs and honey, as well as root vegetables.
- Macrobiotic diets consist mostly of whole grains and beans.

Large-scale studies have shown that mortality from ischaemic heart disease was 30% lower among vegetarian men and 20% lower among vegetarian women than in non-vegetarians. Necessary nutrients, proteins, and amino acids for the body's sustenance can be found in vegetables, grains, nuts, soymilk, eggs and dairy products. Vegetarian diets offer lower levels of saturated fat, cholesterol and animal protein, and higher levels of carbohydrates, fibre, magnesium, potassium, folate, and antioxidants such as vitamins C and E and phytochemicals.
Vegetarians tend to have lower body mass index, lower levels of cholesterol, lower blood pressure, and less incidence of heart disease, hypertension, type 2 diabetes, renal disease, osteoporosis, metabolic syndrome, dementias such as Alzheimer's disease, etc. Non-lean red meat, in particular, has been found to be directly associated with increased risk of cancers of the oesophagus, liver, colon, and the lungs.

Контрольна робота 116

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

ELECTRON CONFIGURATION

Protons have a positive charge and electrons have a negative charge. Free (unattached) uncharged atoms have the same number of electrons as protons to be electrically neutral. The protons are in the nucleus and do not change or vary except in some nuclear reactions. The electrons are in discrete pathways or shells around the nucleus. There is a ranking or hierarchy of the shells, usually with the shells further from the nucleus having a higher energy. As we consider the electron configuration of atoms, we will be describing the *ground state* position of the electrons. When electrons have higher energy, they may move up away from the nucleus into higher energy shells.

A hydrogen atom has only one proton and one electron. The electron of a hydrogen atom travels around the proton nucleus in a shell of a spherical shape. The two electrons of helium, element number two, are in the same spherical shape around the nucleus. The first shell only has one subshell, and that subshell has only one orbital, or pathway for electrons. Each orbital has a place for two electrons. The spherical shape of the lone orbital in the first energy level has given it the name "*s*" orbital. Helium is the last element in the first period. Being an inert element, it indicates that that shell is full. Shell number one has only one *s* subshell and all *s* subshells have only one orbital. Each orbital only has room for two electrons. So the first shell, called the K shell, has only two electrons.

Beginning with lithium, the electrons do not have room in the first shell or energy level. Lithium has two electrons in the first shell and one electron in the next shell. The first shell fills first and the others more or less in order as the element size increases up the Periodic Chart, but the sequence is not immediately obvious. The second energy level has room for eight electrons. The second energy level has not only an *s* orbital, but also a *p* subshell with three orbitals. The *p* subshell can contain six electrons. The *p* subshell has a shape of three dumbbells at ninety degrees to each other, each dumbbell shape being one orbital. With the *s* and *p* subshells the second shell, the L shell, can hold a total of eight electrons. You can see this on the periodic chart. Lithium has one electron in the outside shell, the L shell. Beryllium has two electrons in the outside shell. The *s* subshell fills first, so all other electrons adding to this shell go into the *p* subshell. Boron has three outside electrons, carbon has four, nitrogen has five, oxygen has six, and fluorine has seven. Neon has a full shell of eight electrons in the outside shell, the L shell, meaning the neon is an inert element, the end of the period.

Beginning again at sodium with one electron in the outside shell, the M shell fills its *s* and *p* subshells with eight electrons. Argon, element eighteen, has two electrons in the K shell, eight in the L shell, and eight in the M shell. The fourth period begins again with potassium and calcium, but there is a difference here. After the addition of the 4*s* electrons and before the addition of the 4*p* electrons, the sequence goes back to the third energy level to insert electrons in a *d* shell.

There are several other schemes to help you remember the sequence.

The shape of the *s* subshells is spherical. The shape of the *p* subshells is the shape of three barbells at ninety degrees to each other. The shape of the *d* and *f* subshells is very complex.

Electron configuration is the "shape" of the electrons around an atom, that is, which energy level (shell) and what kind of orbital it is in. The shells were historically named for the chemists who found and calculated the existence of the first (inner) shells. Their names began with "K" for the first shell, then "L," then "M," so subsequent energy levels were continued up the alphabet. The numbers one through seven have since been substituted for the letters. Notice that I have included an "R" shell (#8) that is purely fantasy but makes the chart symmetrical.

The electron configuration is written out with the first (large) number as the shell number. The letter is the orbital type (either *s, p, d,* or *f*). The smaller superscript number is the number of electrons in that orbital.

Use this scheme as follows. You first must know the orbitals. An *s* orbital only has 2 electrons. A *p* orbital has six electrons. A *d* orbital has 10 electrons. An *f* orbital has 14 electrons. You can tell what type of orbital it is by the number on the chart. The only exception to that is that "8" on the chart is "2" plus "6," that is, an *s* and a *p* orbital. The chart reads from left-to-right and then down to the next line, just as English writing. Any element with over 20 electrons in the electrically neutral unattached atom will have all the electrons in the first row on the chart. For instance, scandium, element #21, will have all the electrons in the first row and one from the second. The electron configuration of scandium is: 1*s*2 2*s*2 2*p*6 3*s*2 3*p*6 4*s*2 3*d*1 Notice that the 2*s*2 2*p*6 and 3*s*2 3*p*6 came from the eights on the chart (2+6). Notice that the other electron must be taken from the next spot on the chart and that the next spot is the first spot on the left in the next row. It is a 3*d* spot due to the "10" there and only one more electron is needed, hence 3*d*1.

The totals on the right indicate using whole rows. If an element has an atomic number over thirty-eight, take all the first two rows and whatever more from the third row. Iodine is number fifty-three. For its electron configuration you would use all the electrons in the first two rows and fifteen more electrons. 1*s*2 2*s*2 2*p*6 3*s*2 3*p*6 4*s*2 3*d*10 4*p*6 5*s*2 from the first two rows and 4*d*10 5*p*5 from the third row. You can add up the totals for each shell at the bottom. Full shells would give you the totals on the bottom.

We have included an R shell (#8) even though there is no such thing yet proven to exist. The chart appears more symmetrical with that shell included. The two electrons from the R shell are in parentheses. We have not yet even made elements that have electrons in the *p* subshell of the Q shell.

II. Discuss the following items (6-10 sentences for each statement).

1. Importance of balanced nutrition for our health.
2. Advantages and disadvantages of vegeterianism.
3. Your attitude toward eating meat and other animal products.
4. Importance of eating locally grown food.
5. What do you think about fasting?

III. Translate the following sentences into English using the modal verbs.

1. Білкові продукти повинні складати близько 20% калорій, які ми щоденно споживаємо.
2. Вам немає потреби виснажувати організм малою кількістю калорій, щоб дотримуватися раціонального харчування.
3. Нам потрібно споживати жири для засвоєння жиророзчинних вітамінів A, D, E та K.
4. Нам потрібно пам'ятати, що організму потрібно лише 2 г солі в день, а ми споживаємо до 20 г.
5. Дорослі повинні споживати фрукти від 3 до 5 разів на день.
6. Для того щоб овочі зберігали вітаміни та мінерали, їх слід не варити, а готувати на парі.
7. Дієтологи не наважуються рекомендувати вегетаріанську дієту малим дітям.
8. Їсти слід повільно, добре пережовуючи, витрачаючи на кожен прийом їжі не менше 20 хвилин.
9. Вам слід споживати менше жирної їжі, оскільки вона негативно впливає на серцево-судинну систему.
10. Пояснити вам різницю між вітамінами та мікроелементами?
11. Щодня потрібно випивати від 6 до 8 склянок води, а замість солодкої газованої води слід вживати фруктові соки.
12. Я насмілюся сказати, що дієта радикальних вегетаріанців не є такою вже і корисною для нашого організму.

IV. Fill in the blanks with the words from the table. Translate into Ukrainian.

absorbed amino acids amounts balanced bioavailable cellulose cereals energy fish flavour haemoglobin healing insulation, intake iodine lost minerals protect pulses starches stored undernutrition

A _____ diet contains all the necessary substances required by body cells. There can be adverse effects from overeating as well as from _____ . A varied diet is the best way to ensure an adequate _____ of all the essential nutrients. The essential nutrients are water, carbohydrate, protein, lipid, vitamins and _____ .

Carbohydrates are the main source of _____ . They comprise sugars, _____ and complex polysaccharides. Fruit and vegetables provide carbohydrate but leaves and stalks can be indigestible because they contain more _____.

The component _____ of protein are essential for structural maintenance, physiological regulation and energy supply. High quality protein which is easily digested and _____ is found in meat, eggs, milk, fish and _____ (beans, peas, lentils, etc.).

Lipids provide concentrated energy and are used by the body to store energy. They provide _____ under the skin, _____ major organs from trauma and are required for effective neural function. They give food aroma and _____, increase palatability and give a feeling of satiety.

Only small _____ of vitamins are required. Fat-soluble vitamins are absorbed from the small intestine and are found in _____ and plant oils. They can be _____ in the liver and adipose tissue. Water-soluble vitamins are easily _____ from the body. Vitamin B complex includes thiamine, and nicotinic acid. Foods providing these include _____ (wheat, rye), yeast, milk and eggs.

There are many minerals that are essential for health, but iron, _____, and zinc are the most significant. Zinc is involved in enzyme reactions and is important during periods of growth and wound _____. It is found in animal products. Iron is a major component of _____ and is important in enzyme processes and in the immune response. Iron is found in most foods but must be in _____ form.

V. Give the opposites by adding negative prefixes to the following words.

___proper, ____balance, ____essential, ____saturated, ___active, ___diuretic, ____healthy, ____certain, ___safe, ____toxic, ____oxidant, ____processed, ____refined, ____frequent, ____complete, ____digestible, ____soluble.

VI. Read and translate the text.

Veganism

Vegetarians do not eat meat, fish, or poultry. Vegans, in addition to being vegetarian, do not use other animal products and by-products such as eggs, dairy products, honey, leather, fur, silk, wool, cosmetics, and soaps derived from animal products.

People choose to be vegan for health, environmental, and/or ethical reasons. For example, some vegans feel that one promotes the meat industry by consuming eggs and dairy products. That is, once dairy cows or egg-laying chickens are too old to be productive, they are often sold as meat; and since male calves do not produce milk, they usually are raised for veal or other products. Some people avoid these items because of conditions associated with their production.

Many vegans choose this lifestyle to promote a more humane and caring world. They know they are not perfect, but believe they have a responsibility to try to do their best, while not being judgmental of others.

The key to a nutritionally sound vegan diet is variety. A healthy and varied vegan diet includes fruits, vegetables, plenty of leafy greens, whole grain products, nuts, seeds, and legumes.
It is very easy for a vegan diet to meet the recommendations for protein as long as calorie intake is adequate. Strict protein planning or combining is not necessary. The key is to eat a varied diet. Almost all foods except for alcohol, sugar, and fats provide some protein. Vegan sources include: lentils, chickpeas, tofu, peas, peanut butter, soy milk, almonds, spinach, rice, whole wheat bread, potatoes, broccoli, kale..
Vegan diets are free of cholesterol and are generally low in saturated fat. Thus eating a vegan diet makes it easy to conform to recommendations given to reduce the risk of major chronic diseases such as heart disease and cancer. High-fat foods, which should be used sparingly, include oils, margarine, nuts, nut butters, seed butters, avocado, and coconut.
Vitamin D is not found in the vegan diet but can be made by humans following exposure to sunlight. At least ten to fifteen minutes of summer sun on hands and face two to three times a week is recommended for adults so that vitamin D production can occur. Food sources of vitamin D include vitamin D-fortified soy milk and rice milk. (For more information about vitamin D.
Calcium, needed for strong bones, is found in dark green vegetables, tofu made with calcium sulfate, calcium-fortified soy milk and orange juice, and many other foods commonly eaten by vegans. Although lower animal protein intake may reduce calcium losses, there is currently not enough evidence to suggest that vegans have lower calcium needs. Vegans should eat foods that are high in calcium and/or use a calcium supplement.
Other good sources of calcium include: okra, turnip greens, soybeans, tempeh, almond butter, broccoli, bok choy, commercial soy yogurt...
The recommended intake for calcium for adults 19 through 50 years is 1000 milligrams/day.
Note: It appears that oxalic acid, which is found in spinach, rhubarb, chard, and beet greens, binds with calcium and reduces calcium absorption. Calcium is well absorbed from other dark green vegetables.
Vegan diets can provide zinc at levels close to or even higher than the RDA. Zinc is found in grains, legumes, and nuts.
Dried beans and dark green leafy vegetables are especially good sources of iron, better on a per calorie basis than meat. Iron absorption is increased markedly by eating foods containing vitamin C along with foods containing iron.
The requirement for vitamin B12 is very low. Non-animal sources include Red Star nutritional yeast T6635 also known as Vegetarian Support Formula (around 2 teaspoons supplies the adult RDA). It is especially important for pregnant and lactating women, infants, and children to have reliable sources of vitamin B12 in their diets. Numerous foods are fortified with B12, but sometimes companies change what they do. So always read labels carefully or write the companies.
Tempeh, miso, and seaweed are often labeled as having large amounts of vitamin B12. However, these products are not reliable sources of the vitamin because the amount of vitamin B12 present depends on the type of processing the food undergoes. Other sources of vitamin B12 are fortified soy milk (check the label as this is rarely available in the U.S.), vitamin B12-fortified meat analogues, and vitamin B12 supplements. There are supplements which do not contain animal products. Vegetarians who are not vegan can also obtain vitamin B12 from dairy products and eggs.

Контрольна робота 117

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

PROPERTIES OF MATTER

The Periodic Chart is based on the properties of matter. A property is a quality or trait or characteristic. We can describe, identify, separate, and classify by properties. How would you describe a person? A young man impressed with a young lady might describe her, "She has long dark hair that she keeps in a pony-tail, brown eyes, a long neck, and a very light complexion. She is about 180 centimeters tall and has pierced ears." He has used some of her properties to describe her. You might be able to pick her out of a small group of people based on his description if it is not too inaccurate, too vague, or too biased. Similarly, you can collect a number of properties to describe an element or compound. The properties of the element or compound, though, are true for any amount of the material anywhere. South American gold is indistinguishable from South African gold by its properties.

There are two types of property of matter. Physical properties describe the material as it is. Chemical properties describe how a material reacts, with what it reacts, the amount of heat it produces as it reacts, or any other measurable trait that has to do with the combining power of the material. Properties might describe a comparative trait (denser than gold) or a measured trait (17.7 g/cc), a relative trait (17.7 specific gravity), or an entire table of measurements in a table or graph form (the density of the material through a range of temperatures).

Physical properties include such things as: color, brittleness, malleability, ductility, electrical conductivity, density, magnetism, hardness, atomic number, specific heat, heat of vaporization, heat of fusion, crystalline configuration, melting temperature, boiling temperature, heat conductivity, vapor pressure, or tendency to dissolve in various liquids. These are only a few of the possible measurable physical properties.

Chemical properties include: whether a material will react with another material, the rate of reaction with that material, the amount of heat produced by the reaction with the material, at what temperature it will react, in what proportion it reacts, and the valence of elements.

We can separate or purify materials based on the properties. We can separate wheat from chaff by throwing the mix into the wind. The less dense chaff is moved more by the wind than the denser wheat. We can separate a mixture of sand and iron filings by magnetism. The iron filings will stick to a magnet dragged through the mixture. We can separate ethyl alcohol (good old drinking alcohol) from water by boiling point. This process is called distillation. A mixture of water and insoluble material with alcohol mixed in it will release the alcohol as vapor at the boiling point of alcohol (78 °C). We can separate by solubility. A mixture of table salt and sand can be separated by adding water. The salt dissolves and the sand does not.

II. Fill in the gaps with appropriate prepositions. Translate the text/

Nutritional science investigates the metabolic and physiological responses ___ the body ___ diet. With advances in the fields of molecular biology, biochemistry, and genetics, the study ___ nutrition is increasingly concerned ____ metabolism.

The human body contains chemical compounds, such as water, carbohydrates (sugar, starch, and fibre), amino acids (in proteins), fatty acids (in lipids), and nucleic acids (DNA and RNA). These compounds ____ turn consist ____ elements such as carbon, hydrogen, oxygen, nitrogen, phosphorus, calcium, iron, zinc, magnesium, manganese, and so on. All ___ these chemical compounds and elements occur ___ various forms and combinations (e.g., hormones, vitamins, phospholipids, hydroxyapatite), both in the human body and ____ the plant and animal organisms that humans eat.

The human body consists ___ elements and compounds ingested, digested, absorbed, and circulated through the bloodstream to feed the cells ___ the body. In a typical adult, about seven

liters ___ digestive juices enter the lumen ___ the digestive tract. These break chemical bonds ____ ingested molecules, and modulate their conformations and energy states. Unabsorbed matter, along ___ some waste products ___ metabolism, is eliminated ____ the body in the faeces.

____ general, eating a wide variety ___ fresh, whole (unprocessed) foods has proven favorable compared ___ monotonous diets based ___ processed foods. ___ particular, the consumption ___ whole-plant foods slows digestion and allows better absorption, and a more favorable balance ___ essential nutrients per Calorie, resulting ___ better management ____ cell growth, maintenance, and mitosis (cell division), as well as better regulation of appetite and blood sugar.

III. Read and translate the text. Put questions to the underlined words.

There are six major classes of nutrients: carbohydrates, fats, minerals, protein, vitamin, and water. These nutrient classes can be categorized as either macronutrients (needed in relatively large amounts) or micronutrients (needed in smaller quantities). The macronutrients are carbohydrates, fats, fibre, proteins, and water. The micronutrients are minerals and vitamins.

The macronutrients (excluding fibre and water) provide structural material (amino acids from which proteins are built, and lipids from which cell membranes and some signaling molecules are built), energy. Some of the structural material can be used to generate energy internally, and in either case it is measured in Joules or kilocalories (often called "Calories"). Carbohydrates and proteins provide 17 kJ approximately (4 kcal) of energy per gram, while fats provide 37 kJ (9 kcal) per gram, though the energy from either depends on such factors as absorption and digestive effort, which vary substantially from instance to instance. Vitamins, minerals, fibre, and water do not provide energy, but are required for other reasons. A third class dietary material, fibre (i.e., non-digestible material such as cellulose), seems also to be required, for both mechanical and biochemical reasons, though the exact reasons remain unclear.

Molecules of carbohydrates and fats consist of carbon, hydrogen, and oxygen atoms. Carbohydrates range from simple monosaccharides (glucose, fructose, galactose) to complex polysaccharides (starch). Some fatty acids, but not all, are essential in the diet: they cannot be synthesized in the body. Protein molecules contain nitrogen atoms in addition to carbon, oxygen, and hydrogen. The fundamental components of protein are nitrogen-containing amino acids. Some of the amino acids are convertible to glucose and can be used for energy production just as ordinary glucose. By breaking down existing protein, some glucose can be produced internally; the remaining amino acids are discarded, primarily as urea in urine. This occurs normally only during prolonged starvation.

Poor health can be caused by a lack of required nutrients or, in extreme cases, too much of a required nutrient. For example, both salt and water (both absolutely required) will cause illness or even death in large amounts.

IV. Complete each gap in the text with a compound adjective from the list in each gap.

freshly prepared	**much-reduced**	**home-cooked**
so-called	**time-saving**	**far-reaching**
traffic-clogged	**hard-working**	**home-produced**
ready-made	**large-scale**	**locally grown**

Supermarket food

Few of us have the luxury of _____ food fresh from our own garden, and increasingly we live in a world where such food is becoming rare. Although, supermarkets can sell fresh fruit and vegetables at _____ prices, not everyone buys them. Many people cook very little at home, and in some households few meals are _____ . Frozen and _____ meals are _____ solutions for _____ people, and _____ "convenience foods" sold in supermarkets are beginning to replace more traditional _____ meals in many households. The consequences of such

changes are _____ . Food which might have a long journey from the other end of the country has replaced _____ food, which also means that huge supermarket lorries are added to _____ roads. Small farmers, who produce only small quantities of food, also find that supermarkets prefer _____ production, and are often forced out of business.

V. Open the brackets using the correct tense forms. Pay attention to the modal verbs.

1. You need not *(to exclude)* meat from your diet since it contains iron, and its deficiency can have caused your anaemia.
2. During the periods of growth, children are *(to consume)* zinc.
3. Will you *(to suggest)* me vitamins for good vision, please?
4. Thank you for working out a diet for me, doctor. When shall I *(to visit)* you next time?
5. A diet of a pregnant woman is *(to contain)* adequate amounts of amino acids.
6. If you want to have healthy teeth and bones, you need *(to consume)* food containing calcium.
7. The doctor has told me that I ought to *(to drink)* at least 8-10 glasses of water daily.
8. You should not *(to become)* a vegan if you knew you had vitamins D and C deficiency.
9. I dare *(to say)* that you shouldn't *(to give)* your child so much sweet knowing that he suffers from obesity.
10. Shall I *(to help)* you with choosing the most appropriate diet for you?
11. Shall I *(to prepare)* brown rice with vegetables for dinner? – No, you needn't. I am not a vegetarian any more.
12. Would you *(to explain)* the difference between various types of vegetarian diets to us?
13. You needn't *(to cook)* the vegetables. They preserve their essential vitamins better when steamed.
14. You are *(to exclude)* fats from your diet.
15. Need I *(to stop)* consuming dairy products to become a vegan?

VI. Read and translate the text

Fasting

There are numerous types of fasting, all of which offer the same many healing benefits. Oftentimes, it seems people develop a preference for one certain type or method, and then feel as if the other methods are inferior.

In actuality, all types of fasting have something to offer. Depending on each person's individual lifestyle, health issues, goals, and body chemistry, different methods of fasting will be appropriate for different people. You can choose a method that is appropriate for you right now. And, since all things change, tomorrow you may choose differently. Nothing could be more natural.

There is nothing to lose in attempting a fast. **There is no failure, for even if you "fail" to achieve your stated goal, you *will have* learned and experienced much of value.**

Use the information here to find, or create, a method of fasting that feels right for you now, that fits your goals and your lifestyle, and that you feel a motivation (not dread) toward.

You don't need to do a fast with the word "cleanse" or "detox" in it to rid your body of unwanted toxins. Nor do you need to do a "spiritual" fast in order to benefit spiritually. All types of fasting will lead you on a path to better and higher places.

Your job is to pick among the types of fasting, one that appeals to you, and will work within your lifestyle and responsibilities. Keep in mind, the more severe the fast, the poorer your diet has been, and the less preparation you make, the more detox "symptoms" you are likely to have. For some people, these can be uncomfortable enough to force them into bed.

My first water fast had me, at the end of the first day, in bed with the worst migraine I'd ever had. I had done zero preparation for this fast and was suffering for it. Life responsibilities

were such that I chose to end the fast a little early so I could return to functionality. Within a couple hours of breaking it (with a little piece of fruit), I was at least able to get around.

Juice and fruit fasts are more gentle as the detoxing occurs more gradually. I've done many fruit fasts and have always felt relatively good -- no severe pain or discomfort, just a few aches or a slight headache.

Weigh the options and take an honest look at your life and how much you can sacrifice. Doing a fast that will create strong cleansing and detoxing symptoms will require a lot more dedication from you. Do you have someone to take over your responsibilities? How uncomfortable are you willing to be? How much discomfort can you tolerate? Taking pain killers during a fast is definitely NOT a good idea.

Do you like the idea of cleansing without a great deal of discomfort? It is absolutely possible, and some professionals feel it is healthier to avoid the extreme symptoms, citing the dangers of releasing too many toxins into the blood stream at one time. So you absolutely can take it slower and more comfortably.

A good plan is to start with one-day juice or fruit fasts. Do this once per week until you have few or no detox symptoms, then try a 16-hour or one-day **water** fast. Slow is always the way to go, whether you're fasting for weight loss or for detox. Eventually, when you've rid your body of years of stored toxins and pollutants, you will be able to enjoy the fasting highs others talk about, without any unpleasant side effects.

Categories of fasting methods

- **Dry fasting.** Also known as Absolute Fast, Black Fast, and Hebrew Fast. The most extreme of the types of fasting, dry fasting has spiritual roots, and consists of foregoing food and water for short periods. While not necessarily recommended, it is interesting to read about.
- **Liquid fasting.** As the name implies, this is fasting on liquids only. The liquid fasting page offers an overview of the variety of liquids used in this type of fasting both today and in the past.

Water fasting is the simplest and perhaps the oldest form of liquid fasting. It delivers the greatest level of therapeutic benefit physically and in a short period of time, as detox occurs more quickly. But a water fast can be more difficult to commit to for the beginner.

Juice fasting is extremely popular and offers a modicum of nutritional support in a pure and natural form. Almost any fruit or vegetable can be juiced with the powerful juicers on the market.

The Master Cleanse or Lemonade Diet is a relatively new approach, becoming popular in the 1970s. It includes calories in the form of pure maple syrup. Intestinal cleansing is a major part of the methodology.

- **Partial fasting.** Also sometimes called selective fasting, partial fasting includes some solid food--anywhere from a very little to a lot of solid food. It's not the amount of food, but the exclusion or limitation of certain foods that makes it a partial fast. Cleansing diets and mono-diets, like rice fasting, are partial fasts.

Those who should not fast:

- **Pregnant and nursing women.** The effects of fasting on an unborn fetus are unknown. As far as nursing, Annemarie Colbin, author of Food and Healing, says she fasted a couple times while nursing and her babies acted as if they weren't getting enough to eat. Even though she seemed to be producing the same amount of milk, it apparently contained fewer nutrients.
- **Children.** In the U.S. it is considered ill-advised to permit children to fast, however, in Europe it is permissible if the child is obese and has chosen to fast of his/her own will and is supervised by a professional.
- **Certain medical conditions.** As stated above, you should not fast if you have liver or kidney weakness or disease, or are extremely frail, malnourished, anemic, or exhausted. You should consult a doctor and be under his/her care during fasting if you have a weakened immune

system, severely high blood pressure, medication-dependent diabetes, or weak circulation causing frequent fainting.

With many conditions, it is possible to fast, but the more serious the condition, the more you need professional support during a fast to avoid any problems. If you are on any prescription medications, your requirements for that medicine could vary from day to day, making it necessary you have a doctor monitor you daily.

- **Eating disorders.** Such as anorexia or bulimia.
- **After surgery or a major illness.** Time should be taken to recuperate before attempting a fast. Also, don't fast directly prior to major surgery.
- **Anyone who is afraid of fasting.** Fear does not put you in the proper frame of mind for fasting and can lead to an unpleasant experience. Strong emotions, such as fear, are known to alter the body's physiological processes. It can shut down certain bodily functions. It also is a closed emotional state. Instead, someone embarking on a fast should be relaxed and confident, and feeling open to the positive changes fasting creates.

Контрольна робота 118

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

PERIODIC PROPERTIES

The periodic chart came about from the idea that we could arrange the elements, originally by atomic weight, in a scheme that would show similarity among groups. The original idea came from noticing how other elements combined with oxygen. Oxygen combines in some way with all the elements except the inert gases. Each atom of oxygen combines with two atoms of any element in Group 1, the elements in the row below lithium. Each atom of oxygen combines one-to-one with any element in Group 2, the elements in the row below beryllium. The group of transition elements (numbers 21-30 and 39-48 and 71-80 and 103 up) have never been adequately placed into the original scheme relating to oxygen. The transition elements vary in the ways they can attach to oxygen, but in a manner that is not so readily apparent by the simple scheme. Group 3 is the group below boron. All of these elements combine with oxygen at the ratio of three to two oxygens. Group 4, beginning with carbon, combines two to one with oxygen, etc. Gallium, element number thirty-one, is the crowning glory of the Periodic Chart as first proposed by Mendeleev. Dmitri Ivanovich Mendeleev first proposed the idea that the elements could be arranged in a periodic fashion. He left a space for gallium below aluminum, naming it eka- aluminum, and predicting the properties of gallium fairly closely. The element was found some years later just as Mendeleev had predicted. Mendeleev also accurately predicted the properties of other elements.

Most Periodic Charts have two rows of fourteen elements below the main body of the chart. These two rows, the Lanthanides and Actinides really should be in the chart from numbers 57 - 70 and from 89 - 102. To show this, there would have to be a gulf of fourteen element spaces between numbers 20 - 21 and numbers 38 - 39. This would make the chart almost twice as long as it is now. The Lanthanides belong to Period 6, and the Actinides belong to Period 7. In basic Chemistry courses you will rarely find much use for any of the Lanthanides or Actinides, with the possible exception of Element #92, Uranium. No element greater than #92 is found in nature. They are all man-made elements, if you would like to call them that. None of the elements greater than #83 have any isotope that is completely stable. This means that all the elements larger than bismuth are naturally radioactive. The Lanthanide elements are so rare that you are not likely to run across them in most beginning chemistry classes. Another oddity of the Periodic Chart is that hydrogen does not really belong to Group I -- or any other group. Despite being over seventy percent of the atoms in the known universe, hydrogen is a unique element.

ELEMENT, ION, AND COMPOUND SYMBOLS

For every element there is one and only one upper case letter. There may or may not be a lower case letter with it. When written in chemical equations, we represent the elements by the symbol alone with no charge attached. The seven exceptions to that are the seven elements that are in gaseous form as a diatomic molecule, that is, two atoms of the same element attached to each other. The list of these elements is best memorized. They are: hydrogen, nitrogen, oxygen, fluorine, chlorine, bromine, and iodine. The chemical symbols for these diatomic gases are: H2, N2, O2, F2, Cl2, Br2, and I2. Under some conditions oxygen makes a triatomic molecule, ozone, O3. Ozone is not stable, so the oxygen atoms rearrange themselves into the more stable diatomic form.

The diatomic gases (hydrogen, nitrogen, oxygen, fluorine, chlorine, bromine, and iodine), the Group one elements (lithium, sodium, potassium, rubidium, cesium, and francium), the Group two elements (beryllium, magnesium, calcium, strontium, barium, and radium), Group seven elements, the halogens, (fluorine, chlorine, bromine, iodine, and astatine), and the noble gases (helium, neon, argon, krypton, xenon, and radon). If nothing else, learning these as a litany will help you distinguish between radium, a Group 1 element, and radon, an inert gas.

Groups of two or more element symbols attached to each other without any charge on them indicate a compound. $CaCl_2$ is a compound with two chlorine atoms for each calcium atom. $CuSO_4 \cdot 5H_2O$, cupric sulfate pentahydrate, is also a compound. It has one copper atom and one sulfate ion consisting of a sulfur atom and four oxygen atoms attached to five molecules of water.

Charged particles, called ions, when written with symbols will have the charge, either positive (+) or negative (-), written to the right and superscripted to the chemical symbol. For instance, Na^+ is the symbol for the sodium ion. Atoms or polyatomic ions with charges of more than one, either positive or negative, have a number with the charge. For instance $(CO_3)^{2-}$ is the symbol for the carbonate ion. The carbonate ion has one carbon atom in it, three oxygen atoms, and a charge of negative two. Observe that the charge is outside the parentheses, indicating that the charge is from the polyatomic ion as a whole.

NOBLE GASES

The noble gases, or inert gases, have the following properties: For the most part, they do not make chemical combinations with any elements. There have been some compounds made with the noble gases, but only with difficulty. There are certainly no natural compounds with this group. They are all gases at room temperature. They all have very low boiling and melting points. They all put out a color in the visible wavelengths when a low pressure of the gas is put into a tube and a high voltage current is run through the tube. This type of tube is called a neon light whether the tube has neon in it or not. The inert gases are non-metals because they are not metals, but they are significantly different from the other non-metals. As closely akin as all the noble gases are to each other, they should surely be considered a separate group.

II. Change apart of speech of the capitalized words to complete the text. Translate the text.

Dietary fibre is a carbohydrate (or a polysaccharide) that is incompletely **ABSORPTION** _____ in humans and in some animals. Like all carbohydrates, when it is **METABOLISM** _____, it can **PRODUCTION** _____ four calories (kilocalories) of energy per gram. But in most circumstances, it accounts for less than that because of its limited **ABSORB** _____ and digestibility. **DIET** _____ fibre consists mainly of cellulose, a large carbohydrate polymer that is indigestible because humans do not have the **REQUIREMENT** _____enzymes to disassemble it. There are two subcategories: **SOLUTION** _____ and insoluble fibre. Whole grains, fruits (especially plums, prunes, and figs), and vegetables are **WELL** _____ sources of dietary fibre. Fibre is important to **DIGEST** _____ health and is thought to reduce the risk of colon cancer. For mechanical reasons, it can help in **ALLEVIATE** _____ both constipation and diarrhoea. Fibre **PROVISION** _____ bulk to the intestinal contents, and insoluble fibre especially **STIMULATIVE** _____ peristalsis – the rhythmic muscular **CONTRACT** _____ of the intestines which move contents along the **DIGESTABLE** _____ tract. Some soluble fibres produce a **SOLUBLE** _____ of high viscosity; this is essentially a gel, which slows the **MOVE** _____ of food through the intestines. Additionally, fibre, especially that from whole grains, is thought to possibly help lessen insulin spikes, and therefore **REDUCTION** _____ the risk of type 2 diabetes.

III. Past time expressions. Fill in the gaps with one of the words from the box. Careful! Sometimes *no* word is necessary.

I arrived home *at* six o'clock last night. I saw Jane __-__ yesterday.

ago last in for at when on

a. I was born in Africa_____1970.

b. My parents moved back to England _____ I was five.
c. We lived in Bristol_____ three years.
d. I went to college three years ____ .
e. I found a flat on my own ____ last year,
f. I usually go home ____ the weekend.
g. I didn't go home ____ weekend because some friends came to stay.
h. They arrived _____ three o'clock ____ the afternoon.
i. ____ Saturday evening we went out to a concert.
j. ____ we got home we listened to some music.
k. We got up late ____ Sunday morning.
1. ____ the afternoon we went for a walk.
m. I bought a car a few weeks ____ .
n. I had an accident ____ last night.
o. It happened ____ 7.00 ____ the evening.
p. I took my car to the garage ____ this morning.
q. It will be ready ____ two weeks.

IV. Read and translate the text.

MINERALS

Certain minerals are essential, in small amounts, to many body processes. Minerals make up about 5 percent of the body's weight, and play important roles in every cell; in oxygen transport, in the maintenance of chemical and fluid balances, in regulating heartbeat, and in controlling enzyme and hormone activity. The major minerals, required in quantities of hundreds of milligrams per day, are calcium, magnesium, and phosphorus. A variety of trace minerals, those required in minute amounts, such as zinc, are also essential to health. A balanced and diverse diet should provide all the necessary minerals; supplementation is necessary only in some special circumstances.

Calcium. Calcium is the most plentiful mineral in the body, 99 percent of which is located in the skeletal tissues. The remaining one percent is located in the body's soft tissues and fluids and is essential to functions such as hormone secretion, nerve signal transmission, and muscle contraction. It is crucial that the proper balance of calcium in the body's fluids be maintained. Blood levels of calcium are maintained by intestinal absorption of dietary and secreted calcium, deposition and release of calcium in the bones, and urinary excretion. If dietary calcium is insufficient skeletal calcium stores are released into the bloodstream. Sustained release of calcium from the bones may lead to osteoporosis. **Supplements.** A normal blood calcium level is essential to a healthy life. Calcium supplementation is strongly advised for individuals of all ages, particularly pregnant and lactating women and older adults who do not consume enough dairy products regularly. The recommended daily allowance for calcium is 1000 milligrams and higher for adults; women who are pregnant, lactating have a higher requirement. Rich sources of dietary calcium include milk and dairy products, oysters, broccoli and tofu. Green leafy vegetables often contain high levels of calcium, although large amounts of phytochemicals in some of these sources may limit their absorption.

Magnesium. Magnesium is essential to the function of every living cell. It plays a key role in the manufacture of DNA and protein, bone building, muscle function, and the transmission of nerve impulses. It is also instrumental in releasing energy from glycogen stored in the muscles. The recommended daily allowance of magnesium is 400 milligrams. Sources include leafy green

vegetables, dried peas and beans, soybeans, seeds, nuts, whole grains, meat, poultry, fish, and eggs. Magnesium is often taken with calcium. **Deficiency.** Because of its abundance in numerous food sources, magnesium deficiency is quite unusual. It occasionally occurs in individuals who have an underlying disorder that impairs magnesium absorption or metabolism, such as alcoholism, severe diabetes mellitus, liver disease, kidney disease, or prolonged diarrhea or vomiting. Heavy use of diuretics may also lead to magnesium deficiency. Symptoms of deficiency include depression, insomnia, muscle weakness, tremor, nausea, irregular heartbeat, a prickly or burning sensation, and convulsions. **Overdose.** A toxic dose of magnesium is 6000 milligrams. An overdose can cause calcium and phosphorus depletion. Symptoms include fatigue, diarrhea, slurred speech, profuse sweating, unsteadiness, decreased tendon reflexes, abnormal rhythms and, occasionally, paralysis.

Phosphorus. Plants and animals need phosphorus to live, as well as for normal growth. Plants absorb phosphorus from soil and use it in photosynthesis. People and animals take in phosphorus by eating plants and such foods as meat, milk and eggs. About four-fifth of the phosphorus in the human body occurs in the bones and teeth. Phosphorus makes up an important part of adenosine triphosphate (ATP), a compound that stores energy in body tissues.

Iron. When the body's reserves are low, absorption increases; in general, about ten percent of the iron in one's diet is absorbed. Iron is crucial to the formation of red blood cells. Sources of iron include meats, dried beans and peas, fortified cereals, grain and pasta products, dark green leafy vegetables, and dried fruits and nuts. Eating foods rich in vitamin C with foods that contain iron aids in their absorption. Most balanced diets supply a person with sufficient amounts of iron. Iron supplements should not be taken unless prescribed by a medical professional, after blood tests have determined that a deficiency exists. Symptoms of deficiency include fatigue, pallor, and headache. Many pregnant women also take iron supplements to ensure the healthy development of the foetus. **Iodine** is used by the thyroid gland for the production of thyroxine and other hormones involved in metabolic control. **Sulfur** is used to formulate certain amino acids and is found in several vitamins. **Copper** serves in the manufacture of hemoglobin and the pigment melanin. **Zinc** is a constituent of several enzymes and is essential for normal growth. **Manganese** participates in the formation of urea in the urea cycle and serves as an enzyme activator. **Cobalt** is a component of vitamin B12 and functions in the maturation of erythrocytes.

V. Translate into English.

1. Добре збалансована дієта – з достатньою кількістю м’яса, молочних продуктів, фруктів і овочів – містить більшу частину мінералів, необхідних для здоров’я.
2. Хіміки поділяють всі хімічні речовини на 2 типи – органічні і неорганічні.
3. Деякі мінеральні речовини: натрій, хлор, калій, кальцій, фосфор, і магній – називаються мікроелементами, оскільки вони необхідні організму у відносно великих кількостях.
4. Серед мінералів виділяють також групу мікроелементів. Вони необхідні організму в дуже малих кількостях. До цієї групи належать: залізо, цинк, мідь, марганець, молібден, селен, йод і фтор.
5. Найважливіші мінеральні елементи містяться в ґрунті і, таким чином, присутні в рослинній і тваринній їжі. У природних умовах в організмі може відчуватися недостатність двох мінеральних елементів – йоду і заліза.

VI. Insert prepositions if necessary.

Sodium salts are found .... the fluids ... the body, serum, blood, lymph and tissues. Their concentration ... the tissues is low. They are necessary ... to preserve a balance between calcium

and potassium, to maintain normal heart action and the equilibrium .... the body. They regulate osmotic pressure .... the cells and fluids, act as an ion balance ... the tissues, produce a buffer action ... the blood, and guard .... excessive loss ... water ... the tissues. A deficiency ... sodium salts causes .... such conditions as weakness, nerve disorders, loss ... weight, disturbed digestion and ,,salt hunger". We add sodium chloride or common salt ... food as a condiment.

Sodium is the main mineral constituent ... blood plasma whereas potassium, unlike sodium, is associated chiefly ... cellular structures. The correct content ... potassium is essential .... normal cell function. A deficiency .... potassium causes disorders .... the nervous system, poor digestion, irregular heart action and poor muscular control. Man obtains his potassium largely through the vegetables .... his diet such as: asparagus, beans, beet, cabbage, carrots, celery, lettuce, potatoes, spinach, tomatoes. Potassium is ... most foods as: beef, milk, mollasses, olives, prunes, raisins, and chocolate.

VII. Match the minerals and their functions in the human body.

sodium	It is necessary for regulation of fat amount in the body, helps cells to accumulate oxygen.
potassium	In certain compounds this element acts as a mild laxative and as an antacid medication.
phosphorus	An element found normally in the blood in the oxygen-carrying hemoglobin of the red blood cells. It is given as a medication to treat various types of anemia.
iodine	An element found in all cells. It participates in formation of bone and muscle tissue.
iron	A metallic element found in large amounts in many combined forms in body fluids and cells. The main function of the kidneys is to maintain its balance in the body.
magnesium	This element helps to maintain healthy skin.
zinc	It is found in the enamel, protects teeth from decay.
fluoride	An element found normally in small quantities in the blood. Its metabolism is associated with thyroid function.
manganese	An element normally found in the blood. It controls all electrical activity within the body.

VIII. Add negative prefixes to the following words.

Healthy, absorption, formation, balance, sufficient, organic, important, regular, essential, necessary, to locate, proper, function, usual, order, normal.

Контрольна робота 119

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

METALS

By far the largest category of elements on the Periodic Chart is the metal elements. Metals share a set of properties that are not as universal to them as the inert gases. Metal elements usually have the following properties: They have one, two, or three electrons on the outside electron shell. The outside electrons make it more likely that the metal will lose electrons, making positive ions. The ions of metals are usually plus one, plus two, or plus three in charge. Metals tend to lose electrons to become stable. They will attach to other elements with ionic bonds almost exclusively. When metal atoms are together in a group, there is a swarm of semi-loose electrons around the atoms. These electrons move about freely among the metal atoms making what is called an electron gas. The electron gas accounts for the shininess of metals. When there is a smooth surface on the metal it will reflect electromagnetic waves (to include visible light) in an organized manner. The shininess is also called metallic luster. The same electron gas accounts for the cohesive tendencies of metals. Cohesive means the material clings to itself. This property can be easily seen with mercury. Mercury atoms cling to other mercury atoms or other metal atoms with an incredible tenacity. This same cohesion of metals occurs in the solid state. Silver is very malleable. That means that if you hit it, the material would more likely change shape than shatter. At one time US half dollar coins were made of ninety percent silver. It is illegal to deface money, but school children would take a spoon and beat the sides of the silver half dollars until the edges curled inward. When the center became the right size, it was taken out to make a silver ring beaten to fit your finger. Wire is made by pulling metals through a die. The metal coheres to itself so much that it will reshape itself to the shape of the die as it passes through the hole in the die. This property of being able to be pulled through a die to make wire is called ductility (from Latin *ducere*, to pull or to lead). The presence of the electron gas makes metals good conductors of electricity. Again due to the cohesive property, metals have high melting and boiling points. Almost all metals are solids at room temperature. Metals are usually good conductors of heat. Active metals react with acids. Some very active metals will react with water. Metal elements tend to be denser than non-metals.

NON-METALS

The properties of non-metals are not as universal to them as the metals; there is a great deal of variation among this group. Non-metals have the following properties: Non-metals usually have four, five, six, or seven electrons in the outer shell. When they join with other elements non-metals can either share electrons in a covalent bond or gain electrons to become a negative ion and make an ionic bond. When non-metal elements join by covalent bonds, it is usually to other non-metals. Non-metals can attach together with covalent bonds to make a group of (usually non-metal) elements with a common charge called a radical or polyatomic ion. Elemental non-metals often have a dull appearance. They are more likely to be brittle, or shatter when struck. Although not a constant rule, non- metals tend to have lower melting and boiling points than metals and the solids tend to be less dense. Non-metals are not as cohesive as metals and certainly not ductile. Non-metals are not usually good conductors of heat or electricity. Many non-metals form diatomic or polyatomic molecules with other atoms of the same element. Many non-metals have more than one form of the free element, called allotropes, that appear in different conditions. (The word free here means that the element is unattached to other types of atom, not that it has a monetary value of zero.)

SEMI-METALS

We have pretended that there is a sharp dividing line between the metals and non-metals. This is not the case. The staircase-shaped line between metals and non-metals has several elements on or near it that have properties somewhere between the two categories. By having three electrons in

the outside shell, boron should be a metal element. It is not. Boron is more likely to form covalent bonds like a non-metal than donate electrons like aluminum, the next element down the chart in the same group. Aluminum is definitely a metal in most of its traits, but it has its own idiosyncrasy. Aluminum is amphoteric; it reacts with both acids and bases. Silicon, germanium, arsenic, antimony, and tellurium are on the line between metals and non-metals and exhibit some of the qualities of both. These elements do not really comprise a clear-cut category, but, due to the mix of properties they show, they are often lumped into a classification called semi-metals. Many of the elements on the line are semiconductors of electricity, meaning that they have the ability to conduct electricity somewhere between almost none and full conduction. This property is useful in the electronics industry.

II. Read and translate the text.

CHAMOMILE

Matricaria Recutita or **Chamomile** – its popular name – is a **herbaceous**, annual and **hibernating** plant originating in south-eastern Europe, which nowadays has spread to all continents. The scientific name "Matricaria" derives from the Latin word "***mater***" (mother) and suggests the many uses in mothers' diseases and generally in that of women. Because it is a common plant, it can be found anywhere, in uncultivated areas, on fields, on road edges and so on. The plant loves heat, light (which influences the essential oil contained), and moist soils. The chamomile stem, reaching up to 60 cm, is **striated** and **ramified** at its base, and each branch has flowers. The hermaphrodite flowers with their pleasant **flavour bloom** from May until late August or early September. In this interval, the best harvesting period is noon. Noticeable is the fact that **inflorescent flowers** are harvested before becoming mature. For conservation the plants are put to dry in a thin layer in a dry and **shady** place, after which they are kept in paper bags. In ancient times, chamomile was used to control **neuralgia** and **rheumatism** and the ancient Egyptians used it **to decrease fever**. It is also mentioned in old books about medicinal plants that chamomile’s oil drives away fatigue from the limbs.

Properties. Chamomile flowers contain: essential oils (etheric oil: 0.38 - 0.81%), vitamins B1 and C, mineral substances (phosphorus, potassium, silicon, iron, manganese, calcium, copper, lead, zinc, zirconium), glucides, lipids (in small quantities) and acids. The plant has calming, analgesic, disinfecting and antiseptic, antispasmodic and tonic actions. At the same time, chamomile has an antitoxic action through deactivating the bacterial and carminative toxins, favoring the elimination of intestinal gasses. Externally, chamomile has cicatrizing, emollient and anti-inflammatory effects. Because of its antiseptic and decongestive properties, chamomile also has many applications in cosmetics, being recommended for irritated, damaged or fat complexions.

Treatments and mixtures. Chamomile can be used for an entire series of afflictions and diseases. No matter if we're talking about gingivitis, dental abscess (and dental pains generally), tonsillectomy, stomatitis, hyperacid gastritis, ulcer, enterocolitis, diarrhea, hemorrhoids, flues, colds, sinusitis, bronchial asthma, rheumatism or insomnia, chamomile is a true adjuvant. Being a good sedative, it can be used against stress and anxiety. Chamomile also helps to drive away menstrual problems (as amenorrhea) and other pelvic diseases.

Chamomile infusion. In preparing this infusion, a teaspoon of chamomile flowers is added to a liter of boiled water. The mixture is left a few minutes before being consumed. Inhaling the vapors emanated by the infusion helps in healing colds and sinusitis if the patient remains in a warm place. The tea can be administered to children, when they suffer from bad dispositions, cramps or colics - abdominal pains. Used externally, the infusion can be added to the bath water (four handfuls of flowers to a bathtub) or in the head washing water (one handful). The hair - especially the blond one - becomes silky and shiny. The complexion is also refreshed if it is cleaned with chamomile infusion. Also, conjunctivitis and eye inflammations heal faster with the help of this mixture. It can also be used for gargle (in cases of toothaches), cutaneous eruptions, or cleaning wounds.

Chamomile oil. In a bottle filled with chamomile flowers, cold-pressed olive oil is poured. The bottle is then kept in the sun, well corked up, for a period of approximately two weeks. After this stage, the oil is conserved in the refrigerator.

Chamomile ointment. It is obtained relatively easily, out of two handfuls of fresh chamomile flowers added to 200g of lard. The operation is done when the grease is already warmed. After it starts boiling and spume is formed at the surface, it is all covered and kept in a cool room. After 24 hours, the mixture is warmed again and filtered with the help of a cloth.

Chamomile poultices. A tablespoon filled with chamomile is emptied in a liter of hot milk. After a few minutes, the mixture is filtered and used in poultices. Caution is required as the poultice has maximum effect with warmth. Another way of obtaining poultices: filling a small bag of textile material with dried chamomile flowers. The bag is then introduced into the oven on a tray and heated up for a short time. Then the bag is applied locally for eliminating corporal pains.

III. Put questions to the words in italics.

1. Parts of the plant such as roots, rhizomes, fruits, bark, seeds, flowers, leaves, etc. may be used for *medicinal* purposes. 2. The time of harvesting or collecting plants and herbs is during the period when *active constituents of the plant are highest in their number and quality*. 3. It is necessary to store and preserve *medicinal plants* properly in order to maintain the degree of quality of the drug. 4. The presence of moisture decreases the amount of their *constituents*. 5. It

is not difficult *to compare* odours. 6. Reserpine is described as a *powder*. 7. *Olive* oil has sometimes a tint. 8. The activity of certain drugs is established using different *tests and methods*.

IV. Translate into English.

1. Багато лікарських рослин, таких як конвалія, мак снодійний, часник, ромашка, широко застосовуються в медичній практиці. 2. Відомо, що тільки чотири алкалоїди маку снодійного використовуються в лікувальних цілях. 3. Багато стародавніх книг містять інформацію, яка використовується сьогодні. 4. Якщо ми збираємо лікарські трави, потрібно добре знати період збору кожної рослини і її частин. 5. Багато рослин мають приємний аромат, але гіркий, в'яжучий смак. 6. Стиглі плоди мають специфічний колір, запах і смак. 7. Опіум полегшує біль, сприяє сну, та викликає загальне відчуття спокою. 8. Відомо, що часник є корисним при наступних хворобах: дифтерії, тифі, туберкульозі, пневмонії, при респіраторних інфекціях, астмі, бронхіті та в багатьох інших випадках.

V. Form nouns from the following words.

to grow ..... to maintain.....
to consume ..... to dry .....
to occur ..... to allow .....
to require ..... to lactate.....
to store ..... sufficient .....
to limit ..... pale .....
to deplete ..... to exist .....
to determine..... to sweat.....

VI. Match synonyms in both columns.

amount	multiform	continuous
to absorb	to consume	disease
to eat	quantity	weakness
to store	to damage	lack
fatigue	insufficiency	to take in
deficiency	to ingest	to accumulate
prolonged	illness	exhaustion
disorder	substantial	durable
to impair	volume	to enter
severe	to keep	plentiful
abundance	to deteriorate	acute
to transmit	serious	bounty
diverse	plethora	miscellaneous
crucial	to pass	to contribute
to supply	to grant	ample
profuse	significant	to relay

VII. Give corresponding adjectives.

to act ..... leaf.....
to burn..... abundance.....
supplement..... skeleton.....

deficiency.....
pallor.....
fetus.....
pregnancy.....
to transmit.....
day.....
to eat.....
bone.....
balance.....
intestine.....
health.....
kidney.....
weakness.....
unsteadiness.....
muscle.....
diet.....
pregnancy.....
to help.....

Контрольна робота 120

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

HYDROGEN

We have failed to include hydrogen in any of the categories, for good reasons. Hydrogen just does not match anything else. More than ninety-nine-point-nine percent of hydrogen is just one proton and one electron. A very small proportion (one atom in several thousand) of hydrogen is deuterium, one proton, one neutron, and one electron. An even smaller portion (one hundred atoms per million billion) of hydrogen is tritium, one proton, two neutrons, and one electron. When a hydrogen atom gains an electron, it becomes a negative ion. The negative hydrogen ion, called hydride ion, can be attached to metals, but it is not seen in nature because it is not stable in water. The positive hydrogen ion is what is responsible for acids. There really is no such thing as a (positive) hydrogen ion. Having only a proton and an electron, hydrogen becomes only a proton if it loses its electron. Loose protons attach themselves to a water molecule to make $H3O^+$ ion, a hydronium ion. This hydronium is the real chemical that produces the properties of acids. Elemental hydrogen is a diatomic gas. Except for having a valence of +1, hydrogen has few other similarities with the Group 1 elements. Hydrogen makes covalent bonds between other hydrogen atoms or other non-metals. See hydrogen in the Elements chapter.

GROUPS OR FAMILIES OF THE PERIODIC CHART

This section is not intended as an exhaustive study of the groups of the Periodic Chart, but a quick-and-dirty overview of the groups as a way to see the organization of the chart. Many texts and charts will label the groups with different names and numbers. Chemtutor will attempt to give some standard numbers and identify the elements in those groups so there is no question about which ones we are describing. It is a good idea to have a copy of the Periodic Chart available as you go through this section.

Group I (1) elements, lithium, sodium, potassium, rubidium, cesium, and francium, are also called the alkali metal elements. They are all very soft metals that are not found free in nature because they react with water. In the element form they must be stored under kerosene to keep them from reacting with the humidity in the air. They all have a valence of plus one because they have one and only one electron in the outside shell. All of the alkali metals show a distinctive color when their compounds are put into a flame. Spectroscopy (dividing up the spectrum so you can see the individual frequencies) of the colored light from the flame test shows strong emission lines from the elements. The lightest of them are the least reactive. Activity increases as the element is further down the Periodic Chart. Lithium reacts leisurely with water. Cesium reacts very violently. Very few of the salts of Group 1 elements are not soluble in water. The lightest of the alkali metals are very common in the earth's crust. Francium is both rare and radioactive.

Group II (2) elements, beryllium, magnesium, calcium, strontium, barium, and radium, all have two electrons in the outside ring, and so have a valence of two. Also called the alkaline earth metals, Group 2 elements in the free form are slightly soft metals. Magnesium and calcium are common in the crust of the earth.

Group 3 elements, boron, aluminum, gallium, indium, and thallium, are a mixed group. Boron has mostly non- metal properties . Boron will bond covalently by preference. The rest of the group are metals. Aluminum is the only one common in the earth's crust. Group 3 elements have three electrons in the outer shell, but the larger three elements have valences of both one and three.

Group 4 elements, carbon, silicon, germanium, tin, and lead, are not a coherent group either. Carbon and silicon bond almost exclusively with four covalent bonds. They both are common in the earth's crust. Germanium is a rare semi-metal. Tin and lead are definitely metals, even though they have four electrons in the outside shell. Tin and lead have some differences in their properties from metal elements that suggest the short distance from the line between metals and

non-metals (semi-metal weirdness). They both have more than one valence and are both somewhat common in the crust of the earth.

Group 5 is also split between metals and non-metals. Nitrogen and phosphorus are very definitely non-metals. The element nitrogen as a diatomic molecule forms about eighty percent of the atmosphere. In the rare instances that nitrogen and phosphorus form ions, they form triple negative ions. Nitride (N^{-3}) and phosphide (P^{-3}) ions are unstable in water, and so are not found in nature. All of the Group 5 elements have five electrons in the outer shell. For the smaller elements it is easier to complete the shell to become stable, so they are non-metals and are more likely to form covalent bonds than ionic bonds. The larger elements in the group, antimony and bismuth, tend to be metals because it is easier for them to donate the five electrons than to attract three more. Arsenic, antimony and bismuth havevalences of +3 or +5. Arsenic is very much a semi-metal, but all three of them show some semi-metal weirdness, such as brittleness as a free element.

Group VII (6 or 16) elements, oxygen, sulfur, selenium, and tellurium, have six electrons in the outside shell. We are not concerned with polonium as a Group 6 element. It is too rare, too radioactive, and too dangerous for us to even consider in a basic course. Tellurium is the only element in Group 6 that is a semi-metal. There are positive and negative ions of tellurium. Oxygen, sulfur, and selenium are true non-metals. They have a valence of negative two as an ion, but they also bond covalently. Oxygen gas makes covalent double-bonded diatomic gas molecules that are about twenty percent of the earth's atmosphere.. Oxygen and sulfur are common elements. Selenium has a property that may be from semi-metal weirdness; it conducts electricity much better when light is shining on it. Selenium is used in photocells for this property.

On some charts you will see hydrogen above fluorine in Group VII (7 or 17). Hydrogen does not belong there any more than it belongs above Group 1. Fluorine, chlorine, bromine, and iodine make up Group 7, the halogens. We can forget about astatine. It is too rare and radioactive to warrant any consideration here. Halogens have a valence of negative one when they make ions because they have seven electrons in the outer shell. They are all diatomic gases as free elements near room temperature. They are choking poisonous gases. Fluorine and chlorine are yellow-green, bromine is reddish, and iodine is purple as a gas. All can be found attached to organic molecules. Chlorine is common in the earth's crust, much of it as the negative ion of salt, NaCl, in the oceans. Fluorine is the most active of them, and the activity decreases as the size of the halogen increases.

The inert gases or noble gases all have a complete outside shell of electrons. Helium is the only one that has only an "*s*" subshell filled, having only two electrons in the outer and only shell. All the others, neon, argon, krypton, xenon, and radon, have eight electrons in the outer shell. Since the electron configuration is most stable in this shape, the inert gases do not form natural compounds with other elements. The group is variously numbered as Group VIIIA, 8, 8A, 0, or 18. 'Group zero' seems to fit them nicely since it is easy to think of them as having a zero valence, that is no likely charge.

The Transition Elements make up a group between what Chemtutor has labeled Group 2 and Group 3. Transition elements are all metals. Very few of the transition elements have any non-metal properties. Within the transition elements many charts subdivide the elements into groups, but other than three horizontal groups, it is difficult to make meaningful distinctions among them. The horizontal groups are: iron, cobalt, and nickel; ruthenium, rhodium, and palladium; and osmium, iridium, and platinum. Iron is thought to be plentiful as a molten mass in the center of the earth.

Lanthanides and actinides are called the Inner Transition Elements. Lanthanides, elements 57 through 70, are also called the rare earth elements. They are all metal elements very similar to each other, but may be divided into a cerium and a yttrium group. They are often found in the same ores with other elements of the group. None are found in any great quantity in the earth's crust. Of the Actinides, elements 89 through 102, only the first three are naturally occurring, the

rest being manufactured elements. Of the three naturally occurring ones, only uranium is likely to be referred to in any way in a basic chemistry course. Elements 103 through 109 have been manufactured, and they have been named by the IUPAC (International Union of Pure and Applied Chemistry), but they are not of much importance to this course.

II. Read and translate the text

History of herbs. Since prehistoric days, plants have been used for food and medicine. The first known written record of curative plants was of Sumerian herbal of 2200 BC. In the 5th century BC, Greek doctor Hippocrates identified approximately 400 herbs in common use. Dioscorides, in the 1st century AD, wrote a herbal by using 600 plants which became the base for many later works. Herbs have been used for various purposes like healing the sick and infirm. Man has also been aware of the effects of herbs on the body, mind and emotion. For example – flowers were utilized to attract love, food and protection; fragrant plants were worn to heal the body and give a sense of well being. The most costly flowers were offered to gods and goddesses and the use of aromatic incense was recorded in the earliest times.

Herbs are considered to be food rather than medicine because they're complete, natural and pure, as nature intended. Unlike chemically synthesized, highly concentrated drugs that may produce many side effects, herbs can effectively realign the body's defences. Herbs do not produce instant cures, but rather offer a way to put the body in proper harmony with nature. Herbs have been used in the following ways – for flavouring foods, in perfumes, as disinfectants, as medicines.

Collection and storage of medicinal plants

Time. Therapeutic efficacy varies during different times or seasons of the year. The constituent and active principles vary quantitatively at different seasons of the year and the majority of plant materials are usually best collected during the dry season, when the herbs are at peak maturity and concentration. Dry as quickly as possible, away from bright sunlight, to preserve the ingredients and prevent oxidation. **Roots and rhizomes.** Best collected October to February, when the plants are more vigorously storing nutrients in their underground parts. **Leaves.** The most suitable time is when the plant is about to bloom. **Flowers and inflorescences.** Buds are preferred, best collected in the morning after the morning dew has evaporated; flowers, just before or shortly after opening. Dry the herbal materials as quickly as possible. **Bark materials and stems.** Generally, best gathered in summer time. When the climate is warm and humid, the bark of any plant usually contains richer nutritive substances including the medicinal metabolites. Preferably, barks and stems should be removed only from fully grown plants. Do not remove all the bark or a band of surrounding bark. **Fruits and seeds.** Fully ripened fruits and mature seeds are preferred. Collection of pod fruits is done in the morning to avoid unnecessary opening of the fruit wall to the detriment of losing the seeds. Turn the fresh fruit frequently for even better drying. **Whole plant.** When the whole plant is desired, it is advisable to harvest the plant at the time when the flowers are all in bloom. Old and withering plants are less effective when used as a source of drugs.

Storage. Many medicinal plants are seasonal, some not easily accessible, available only in deep forests or mountain peaks. Such restrictions necessitate ways and devices to store them for future use. Dirt and other foreign substances should be removed. If washing is needed, it should be done quickly to minimize deterioration and loss of active substances. As a rule, all parts of the plant collected should be dried as soon as possible to avoid unnecessary waste of the drug materials through natural processes of denaturation, decay and fungal attacks. Some commonly used storage methods are as follows: **Sun-drying method:** Spread the herbs over the dry beaches, patio or benches that are **under the direct scorch of the sun** until the materials turn dry and brownish. **Shade-drying method:** Some plant materials are preferably dried in shade at room temperature by wind action because of heat-labile substances that they contain. As such,

free circulation of air is important. Drying processes should be shortened, if higher drug contents are to be sought for. Floral and fruit materials should be dried by this method. **Heat-drying method:** Some materials may be placed over an oven and dried under the intense heat released or under regulated soft heat. Plants that contain high sugar and starch are best preserved by this method. In places where the rain falls throughout the year, this method is strongly recommended.

The dried plant materials should be placed in plastic containers or tightly covered bottles; brown colored bottles are preferred as they minimize deterioration due to sunlight. Dry charcoal (separated from the medicinal plant) may be placed inside the bottles to absorb moisture. The storage place should be dry, well-ventilated, and spacious, lest fungi and insects may invade. Dry materials after proper processing can be kept in large open wooden shelves. The humidity of the storehouse should then be as low as possible. Materials rich in volatile oils are advised to be kept in airtight containers. Otherwise, their efficacy will decrease as time passes by. If all factors are favorable, the prepared drugs can be used even after years of storage.

Making Herbal Medicines

There are several ways to prepare herbs for consumption and use in medicinal remedies. When herbs are prepared by steeping in boiling water to be drunk as a tea, they are known as an **infusion**. If these dried herbs get simmered in hot water, they are called decoction. If mixed with other ingredients and made into cream, they are viewed as the herbal **ointment**. Herbal **compress** is a piece of cloth soaked in an infusion or decoction and wrapped and applied externally. Herbal infusions and decoctions can also be used as herbal bath for relaxation and healing.

Extractions. An extraction is any herbal medicine that has as its basis the extracted fluid or properties of a plant, but does not contain particles of the actual plant material itself.

Infusions: Sometimes called **tisanes**, infusions, extracts obtained by soaking, are the quickest way of producing herbal medicines.

Decoction is the extraction of the water-soluble substances of a drug or medicinal plants by boiling. The art of preparing a good decoction takes minutes to learn and years to master. Made correctly, they are potent medicines that need to be taken only in relatively small amounts. Decoctions are particularly valuable when making medicines from roots or bark, as their active constituents cannot normally be drawn out in sufficient quantities simply by making an infusion.

Tinctures: (sometimes called **macerations**.) Alcohol is much more effective than water for drawing out the medicinal properties of plants. Because of this, many herbalists soak fresh or dried herbs in alcohol for prolonged periods. The resultant mixture is an extremely potent medicine that should be administered in small amounts.

One of the greatest **advantages** of herbal medicine as a therapy is that it is – when administered correctly – completely safe. Despite the fact that herbal preparations are far safer than synthetic medicines, they must still be used with caution. Some plants are extremely toxic and can cause serious poisoning or even death.

III. Complete the following sentences.

1. Flowers are collected ... . 2. Bark is collected in the spring before ... . 3. Roots and rhizomes are collected in autumn after .... 4. Man has known about the medicinal properties of plants since ... .5. Fruits may be collected either before or after .... 6. Seeds may be collected when .... 7. Odour is described as characteristic when .... . 8. The odour of rose is described as ... . 9. The usual ... for fruits or seeds is globular. 10. The odour of a drug of plant origin depends upon the amount of ... constituents. 11. Olive oil is described as a pale yellow ... which sometimes has a greenish tint. 12. The psychological ... of opium plant was known to the ancient population of many south-eastern countries. 13. Garlic is used in the treatment of many ... in a pure state or as a compound or mixture. 14. Due to modern laboratories it can be shown how garlic ... microbes. 15. All parts of every plant differ as to ... . 16. ... and ... are the parts of the plant which can grow deeply into the earth. 17. Little children like more ... food than salty. 18. During storage too

much ... can increase the weight of the drug and affect its active constituents. 19. When photosynthesis in plants is most active ... begins. 20. A certain degree of moisture is ... during long storage of medicinal herbs. 21. Unripe seeds and fruits are used with medicinal ... only in certain cases. 22. Many centuries ago nature was considered as a .... of drugs. 23. Some peoples use ... as daily food.

IV. Answer the following questions.

1. What facts prove that the attention to the medicinal properties of plants has greatly increased at present? 2. How can you define fruits and seeds? Roots and rhizomes? 3. What period do we call "proper time of harvesting"? 4. Are different parts of plants and herbs gathered at different period? Give some examples. 5. Why is it necessary to gather medicinal plants at proper time? 6. What factors affect the amount and quality of plant constituents? 7. What are the usual shapes of fruits and seeds? 8. What odour do we call "characteristic"? 9. Into what groups are medicinal herbs divided according to taste? 10. How is pharmacological activity of certain drugs established?

V. Use one of the verbs in the box to fill each gap. Put the verb in the Past Simple.

fall find spend lose need
hurt laugh take leave save
celebrate can't (past = couldn't)

Three days lost, alone, and injured on a mountain

Gary Smith yesterday _____his 18th birthday, but he's lucky to be alive. In March this year, he was climbing Ben Nevis, Britain's highest mountain, when he (a)_____ his way and (b)_____ three days in sub-zero temperatures. 'My friends (c)_____ at me for having so much survival equipment, but it (d)_____ my life.' On the first night, the weather was so bad that it tore his new mountain tent to pieces, so he moved into a Youth Hostel for the night. He (e)_____ the hostel at
10.00 the next morning, but he was soon in trouble. 'I (f)_____ off a rock and (g)_____ my knees. I (h)_____move.' Mountain rescue teams went out to look for Gary, and (i)_____ him at 1.00 in the morning. A helicopter (j)_____ him to hospital, where he (k)_____ several operations. 'Next time I'll go with my friends, not on my own!' he joked.

VI. Put questions to the italicized words.

1. Our friends will come to see us *today*. 2. *They* will arrive in some minutes. 3. His parents will be *at home* after six. 4. The peace talks will be held *next month* in Vienna. 5. Jack won't go to the cinema *because he* is *busy*. 6. *We'll* play chess this evening. 7. We'll get up *at seven* tomorrow. 8. The plant will make *agricultural machines.*

VII.Complete the table with missing forms.

VERB	NOUN	ADJECTIVE
		various
to establish		
	invasion	
to destruct		
	accumulation	
		defensive
	inflammation	

to interfere		
	response	
		circulatory
to develop		
		able
	infection	
to administer		
		inherited
to involve		

Контрольна робота 121

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

ABOUT THE ELEMENTS

There are only a few more than one hundred elements. Of those, only eighty-three are not naturally radioactive, and of those, only fifty or so are common enough to our experience to be useful in this course. These elements, though, are going to stay the same for a long time. You may have memorized the states and capitals of the United States. The elements will outlast any political entity. You have certainly memorized and internalized the English alphabet. The elements will be around long after the letters of any alphabet are gone. It would serve you well to know the elements. If you were to attempt to read anything without knowing your letters, you would be in trouble. Let's say you still have a hard time telling the difference between a "b" and a "d."Your fluency in reading would be ruined by having to look up the difference every time you encountered one of those letters. Similarly, you should know your elements well enough so that if you read or hear about one of them, you instantly know what they are. Learn how to spell the names of the elements. Learn the symbols. Learn where the common elements are on the periodic table. Some of the symbols have one letter, some have two, but each element symbol has one and only one upper case letter in it.

COMMON ELEMENTS

You should know the name and symbol for the following elements. If you see the name, you should know the symbol. If you see the symbol, you should know the name. For the elements in the right-hand row there are other names for the element, sometimes Latin, from which the element symbol was derived or some other name that makes the element more recognizable. You do not need to know the names in parentheses. Some of the elements in this table were included because they are in a particular group rather than being common themselves, such as the Noble or inert gases. Others were included because they are important to know, such as uranium, polonium, and tungsten.

Helium He	Lithium Li	Hydrogen H	Sodium (Natrium) Na
Boron B	Carbon C	Silicon Si	Calcium (Lime) Ca
Beryllium Be	Fluorine F	Neon Ne	Sulfur (Brimstone) S
Phosphorus P	Nitrogen N	Aluminum Al	Potassium (Kalium) K
Chlorine Cl	Argon Ar	Magnesium Mg	Iron (Ferrum) Fe
Bromine Br	Oxygen O	Manganese Mn	Copper (Cuprum) Cu
Cobalt Co	Nickel Ni	Chromium Cr	Lead (Plumbum) Pb
Zinc Zn	Krypton Kr	Rubidium Rb	Silver (Argentum) Ag
Iodine I	Platinum Pt	Cadmium Cd	Tin (Stannum) Sn
Cesium Cs	Barium Ba	Francium Fr	Antimony(Stibium) Sb
Bismuth Bi	Arsenic As	Strontium Sr	Tungsten(Wolfram)W
Radon Rn	Xenon Xe	Polonium Po	Gold (Aurum) Au
Radium Ra	Uranium U	Mercury (Hydrargyrum or Quicksilver) Hg	

Sulfur, S. The brimstone of the Bible, sulfur was most likely encountered by prehistoric humankind near geothermal sources such as volcanoes and geysers. Sulfur's two crystal forms, monoclinic and rhombic, both have a melting temperature just above the boiling point of water at one atmosphere. Under pressure, as under the earth, water temperature can exceed the melting temperature for sulfur. Since sulfur does not dissolve in water, the liquid sulfur immediately solidifies as it reaches the earth's surface, leaving the distinctive non-metal pale yellow brittle solid. The Frasch process for mining sulfur does exactly the same as the geothermal process. Superheated water under pressure is pumped into the earth and retrieved with melted sulfur in it, mimicking the natural process for sulfur exposure. There is another non-crystalline form of elemental sulfur that can be made by melting crystalline sulfur, but the amorphous allotrope is

unstable, reverting to one of the crystalline forms on standing. Sulfur burns in air (the stone that burns) to form sulfur dioxide. This is the first step in the manufacture of sulfuric acid, by far the most used compound of sulfur. It has been said that the amount of sulfuric acid made is a good measure of the level of industrialization of a country. Sulfur is one of the main ingredients in the vulcanization of rubber.

Hydrogen, H. The most famous mental picture of hydrogen is the burning of the zeppelin Hindenburg. There are some who claim that the fire that finished the Hindenburg was lit by the fabric that contained it rather than the explosive tendencies of the hydrogen itself, but a lot of hydrogen burned that day.

Hydrogen is the lightest (least dense) of the elements and the lightest of the gasses. The lift that the Hindenburg got from the elemental hydrogen in its gas bags was the best in the world -- with the one small flaw that hydrogen burns explosively with oxygen to make water. Airships today use another "lighter-than-air" gas, helium, to get lift.

Almost all the hydrogen on earth is in the form of compounds, mostly water. Elemental hydrogen is one of the major components of stars. Large amounts of elemental hydrogen are used for fixing nitrogen for fertilizers and for hydrogenation of fats and oils. Hydrogen is a diatomic gas as an element. It usually appears at the top of Group 1 on the periodic chart, but hydrogen is not a member of Group 1. With only one proton, hydrogen has only one electron in a shell that can only contain two electrons. Hydrogen can lose one electron to become a positive ion, as in acid, or it can collect another electron to produce a hydride (H^-) ion with a full shell. In spite of a marked decrease in research funds, fusion power from hydrogen isotopes deuterium and/or tritium seems almost within the grasp of human technology at this writing (2011). Certainly, with some of the problems with fission nuclear energy sources, the prospect of getting safer nuclear energy should be welcomed.

There are many people working on the possibility of using hydrogen as a chemical fuel for vehicles.. The 'hydrogen economy' would require some changes in the way we do things, but may be the only way we have as our petroleum resources run out. Here are some references on the use of hydrogen as a fuel.

Gold, Au. Gold is likely the earliest metal known to humanity because it can be found in its native form and is easier to work (softer) than copper, which also is found in its native form. Gold is the least active of the metals. The gold of the ancient Incas buried many hundreds of years can be unearthed as shiny as it was when new. Gold is an excellent conductor of heat and electricity. It is used in electrical circuitry that is either exposed to weathering or must be reliable for many years. Gold is the most malleable material. It can be pounded into incredibly thin sheets. Pure gold is too soft a metal to make swords, but it is commonly used for jewelry. In the U.S., Most gold jewelry in the US is 14 carat or about 58% gold in the alloy. The distinctive metallic yellow of gold is known and highly valued throughout the world.

II. Make the following interrogative and negative.

1. The meeting will begin at eight. 2. They will be in Brussels, the day after tomorrow. 3. She will cook breakfast for us. 4. We shall start at dawn. 5. The boy will be seven next year. 6. The plane will take off in five minutes. 7. We shall climb the mountain next week. 8. I shall see you on Monday. 9. I'll buy a camera next month.

III. Put the verbs in brackets into the correct form.

1. More and more people (**go**) to medical universities these days.
2. I can’t walk any more. My knee really (**hurt**).
3. Maria (**not, remember**) anything about the accident, except that she (**not, drive**) too fast and in fact almost (**stop**) before she reached the crossroads.
4. Have you always worked as a nurse? No, I (**be**) a babysitter.

5. He is a surgeon. He (**operate**) many patients already. He (**perform**) an operation now. He (**operate**) for two hours already.
6. Kate was in hospital because she (**crash**) her car.
7. I was running when I (**slip**) on the ice and (**break**) my leg.
8. Nick (**break**) his arm, so he couldn't write for six weeks.
9. Have you been working at this hospital long? Yes, by next month, I (**work**) here for ten years.
10. Are you nervous about the job interview? Yes, this time tomorrow I (**talk**) to the manager of the hospital.
11. I feel tired. How can you feel tired? You (**not, do**) a thing all day.

IV. In each of the sentences below, decide which word in bold is more suitable.

1.During the 1970's and 1980's, it became increasingly **evident** / **visible** that companies in the West were uncompetitive.
2. The United Kingdom **makes** / **publishes** more books than any other country.
3. There has been a major road accident, **involving** / **including** 23 cars and 16 lorries.
4. On the basis of the latest survey, we know that most people have a very **negative** / **bleak** view of politicians and their parties.
5. In many parts of the world, people are becoming more worried about the danger of pollution and its effect on the **environment** / **ecology**.
6. Education experts from France travelled to Japan to **evaluate** / **judge** the secondary school system there.
7. Although it is not very big, the library has an excellent **range** / **variety** of books, journals and other resources for study.
8. Increasingly, the design of buildings is being **adjusted** / **modified** to allow easier access for disabled people.
9. The lack of extra student accommodation **restricted** / **narrowed** the expansion in student numbers which the university was planning.
10. Many students **acquire** / **derive** a great deal of enjoyment and satisfaction from their time at university.
11. Although the world is getting warmer slowly, the increase in temperature **varies** / **fluctuates** fromcountry to country.
12. Following the bank raid, the police **followed** / **pursued** the robbers but were unable to catch them.
13. Assessment on this course **includes** / **consists of** coursework (30%) and examinations (70%).

V. Read and translate the text.

Tinctures - What are they and how do you use them?

What is a tincture you may ask... Tinctures are liquid extracts made from herbs that you take orally (by mouth). They are usually extracted in alcohol (known here on our website as "regular"), but they can also be extracted in vegetable glycerine or apple cider vinegar (non-alcohol). Tinctures are easy and convenient to use. Tinctures are also easier to give to children as they have to take only small amounts. Because they are taken directly under the tongue, they enter the bloodstream much more directly than by any other means. This means that the action in the body is usually quicker. Although some herbs will have an immediate effect, such as those used to help one relax. Others that are more nutritive and building in nature. Nutritive tinctures may take several weeks of continual use before best results are seen.

Tea vs. Tincture?

Teas and tinctures are made from the same combination of herbs. For example, Tummy Tincture is made from Tummy Tea, and Nursing Tincture is an extract made from Nursing Tea,

so the herbs are the same - it's just two different ways of taking them. Some people enjoy teas and enjoy the relaxing aspects of taking a time-out to drink a cup of tea. Others may not care for tea or do not have time to brew and drink a cup of tea. For these people, a tincture is perfect. Tinctures are also very convenient, as nothing needs to be brewed. You simply take the drops of tincture and you're done. You can easily carry a bottle of tincture in your purse and have it available to you at all times. (Tummy Tincture for gas and tummy upset, and Rescue Remedy for anxiety, nervousness or injuries are popular items for one's purse.)

When you want an immediate response, such as herbs for relaxation or sleep, a tincture may give you more immediate results. For nutritive herbs, either a tea, a tincture or a capsule would be fine. It comes down to personal preference.

Note: Two droppersful of tincture equals one 8 oz. cup of tea.

You may put the droppersful of tincture into a warm cup of water to make an instant tea!

What is a Tincture Dropperful? How Do You Take a Tincture? Why won't the glass tube fill all the way when I squeeze the dropper top?

Tinctures are usually taken by the dropperful (also known as a squeeze). A dropperful is the amount of liquid that fills the glass tube of the dropper when the bulb on the dropper top is squeezed and released. The liquid may fill the glass tube only a small portion of the way, but that is considered a "dropperful". A dropperful equals approximately 30 drops.

On all dropper tops, no matter how large or small of a tincture bottle it comes with, the bulb (the thing you squeeze) is the same size on them all. The bulb is what determines how much liquid fills the tube, not the length of the tube itself.

A standard suggested adult dosage for tinctures is 2 droppersful two to three times a day. For children under 12, please see our ***Children's Dosage Guide*** for recommendations.

With this standard dosing suggestion (for adults) of two droppersful three times a day, tincture bottles typically last this long:

- **1oz. tincture bottle will last about one week**
- **2oz. tincture bottle will last two weeks**
- **4oz. tincture bottle will typically last about a month.**

To take a tincture, it is best to take the drops directly under the tongue. This gets the herb directly into the bloodstream. If necessary, it is fine to dilute the tincture in a small amount of water or juice. It may be flavored with lemon or honey to disguise the taste. (**Note:** never give honey to a child under one year of age.) You may also put the droppersful of tincture into a cup of warm or hot water for an instant cup of herbal tea. Heat your water first, before adding the herbs. Heating the herbs in a microwave may kill or weaken their healthful benefits. Taking the tincture directly under the tongue and avoiding any liquids or foods for at least 15 minutes afterwards provides the best results.

Are Tinctures Safe for Pregnant or Nursing Women? How About Children and Babies?

Yes, tinctures are fine for pregnant and nursing women, even the alcohol-based versions. One dose of an alcohol-based tincture has approximately the same alcohol content as eating a very ripe banana. Herb Lore does offer non-alcohol versions of nearly all of our herbal tinctures. Non-alcohol tinctures are good for children, those with alcohol sensitivities, or for those who simply prefer a non-alcohol product. If you are pregnant or nursing, we invite you to see our list of ***Herbs to Avoid During Pregnancy and Lactation*****.**

For babies, we recommend that nursing mothers take the tincture, which will then pass on to their babies through the breastmilk. For those who are not nursing, please see our FAQ's page for ideas as to the best ways to administer herbs to your baby. The Children's Dosage

Guide outlines general dosage recommendations for children, which is available on our website under the Articles & Information section.

For some herbs, such as roots, barks, berries, and non-aromatic seeds, it takes a powerful liquid such as alcohol to extract the medicinal properties from the herb. Extracting with a less-powerful liquid will only result in a less-effective product - really, a waste of your time and money. This is why you will see some of Herb Lore's tinctures available only in an alcohol-base. For those who prefer a non-alcohol product and there's not one available, you can put the drops of tincture into a small amount of hot water (the amount is not important), and this will dissipate the alcohol content, leaving only the herb matter behind. (Be careful not to have your water so hot that you burn yourself though! It doesn't have to be that hot!)

What is the Shelf Life of my Tinctures? How Should I Store Tinctures? What are they made with?

Tinctures are extracted most often in alcohol because it is such a potent solvent. As mentioned before, some herbs simply will not release their medicinal qualities to a solvent that is less potent, such as water, apple cider vinegar or vegetable glycerine. It takes something stronger, and alcohol is perfect. It also acts as an effective preservative. Alcohol-based tinctures have a virtually unlimited shelf life if stored in a cool, dark location. Refrigeration is not necessary.

Tinctures made from apple cider vinegar are wonderful, as the apple cider vinegar has wonderful health-building qualities of its own. They can be used as salad dressings, marinades or in foods, as well as for your regular tincture use. The shelf life of apple cider vinegar tinctures is very short - about a year or so if kept in a cool, dark cupboard or refrigerator (recommended). Apple cider vinegars are considered non-alcohol tinctures.

Vegetable glycerine is also used to make non-alcohol tinctures – these tinctures are known as glycerites. They have a much longer shelf life than the apple cider vinegar - 3 to 5 years if stored in a cool, dark cupboard. Tinctures made of vegetable glycerine are wonderful for children. They have a sweet taste to them and can make even bad tasting herbs taste good! Glycerine does not have the extraction power that alcohol does, but it still does a fantastic job and results in a highly effective product. They are a great choice for children or for those who prefer a non-alcohol product.

Please see the article entitled ***Storage of Your Herbal Products*** for more details on storing and maintaining your herbs, to ensure their quality and freshness, and how to keep from contaminating your herbal product.

Herb Lore offers tinctures that are made of alcohol (brandy) and vegetable glycerine. We offer both versions of our tinctures, unless the herb used will not produce a good quality product using the non-alcohol vegetable glycerine. Roots, hard seeds and many barks will not release their medicinal properties to anything less than alcohol, and in those cases, we offer the tincture in the regular alcohol-base only.

Store your tinctures and all of your herbs in a cool, dark cupboard. This includes your cooking spices, which most people keep above a hot stove. Keeping them in a heated area can cause your herbs and spices to become weak more quickly. You may carry and keep tinctures in a purse or briefcase. Be sure not to leave your tinctures in a hot area for long periods of time, such as in a car, as heat can negatively impact the quality of your herbal products.

VI. Choose the most appropriate linking word/phrase.

1. **If / Although / Since** the doctor was tired he went to work.
2. She lost her job **if / as if / because** she was ill.
3. **Because / Not only / In spite of** well done operation, the wound continued to bleed.

4. **If / Though / Unless** you need to check your eyesight, go and see a doctor.
5. Let's start the daily round now, **else / so that / as well as** we are sure to have enough time.
6. He works as a doctor in our hospital **as though / in case / as well as** studies at Law Faculty.
7. She went to bed **in short / because / in case** she felt ill.
8. In England, **if / like / besides** you are ill you can either send for the family doctor or else go and visit him at his surgery.
9. **As soon as / Since / Although** my wife is expecting a baby, she is in the maternity ward at the moment.
10. You doctor may recommend you to take sleeping tablets **in case / before / where** you suffer from insomnia.

VII. Write the opposites of the following words by writing the negative prefixes.

____function, ____specific, _____sufficient, ____known, _____usually, ____responsiveness, _____sensitive, _____active, _____frequent, _____likely, _____tension.

Контрольна робота 122

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

REACTIONS OF COMMON ACIDS

Acids react with a wide range of metals, oxides, hydroxides and carbonates to form salts in neutralisation reactions. The reactions of acids with metals, oxides, hydroxides, carbonates and hydrogencarbonates are described and lots of examples of word and symbol equations. Part 4 Describes and explains the reactions of common acids like hydrochloric acid, sulfuric acid and nitric acid with moderately reactive metals, metal oxides, metal hydroxides, metal carbonates and aqueous ammonia solution. What is formed in these reactions? Are the products of these reactions of any use? These revision notes on chemical reactions of acids e.g. sulfuric, hydrochloric and nitric acids, should prove useful for the new AQA chemistry, Edexcel chemistry & OCR chemistry GCSE (9–1, 9-5 & 5-1) science courses.

- **Acids are neutralised** by reaction with metals, oxides, hydroxides or carbonates to form salts and other products.
- Apart from metals (which is an electron loss/gain **redox reaction**), the other reactants listed above are considered as bases, meaning they react by accepting a proton from an acid in forming the salt. Water soluble bases are known as **alkalis**.
- The reaction between acids and bases/alkalis like oxides, hydroxides and carbonates are classified as **neutralisation reactions**.
- The first part of the salt name is derived from the positive ion in the base e.g. sodium, magnesium, ammonium etc.
- The second part of the salt name is derived from the acid e.g. chloride (from hydrochloric acid), sulfate (from sulfuric acid), nitrate (from nitric acid) etc.
- You need to be able to predict the products of these reactions and know **how to work out the formula of a salt**given common ions.
- The reaction between a metal and an acid is technically what is called a **REDOX reaction**.
- This means the reaction takes place in two parts, an **oxidation** involving electron loss and a **reduction** involving electron gain.
- The metal atoms lose electrons to form positive ions (an oxidation to form the positive metal ion).
- The hydrogen ions gain electrons to form hydrogen gas molecules (reduction, which takes place on the metal surface).
- These changes can be written as **half reactions** and then combined to give the full redox ionic equation.
- e.g. for the reaction of magnesium with hydrochloric acid or sulfuric acid, you can write
- (i) **$Mg(s) \Longrightarrow Mg^{2+}(aq) + 2e^-$** (oxidation half equation, electron loss from Mg)
- (ii) **$2H^+(aq) + 2e^- \Longrightarrow H_2(g)$** (reduction half equation, electron gain by H^+)
- adding (i) + (ii) gives the full redox ionic equation ...
- (iii) **$Mg(s) + 2H^+(aq) \Longrightarrow Mg^{2+}(aq) + H_2(g)$**
- ... because the two electrons cancel each other out
- You can write exactly the same sort of equations, whatever the acid and can also substitute Mg with e.g. Zn or Fe.
- Note that the chloride ion (Cl^-) or sulfate ions (SO_4^{2-}) don't figure here, they are spectator ions, they don't take part in the reaction, its just the hydrogen ions that are involved from the acid - their formation is shown below.
- You can think of hydrochloric acid behaving as: $HCl(aq) \Longrightarrow H^+(aq) + Cl^-(aq)$

- and for sulphuric acid: $H_2SO_4(aq)$ ===> $2H^+(aq)$ + $SO_4^{2-}(aq)$
- because that is exactly what happens when you dissolve hydrogen chloride and sulfuric acid in water - they ionise and its the hydrogen ion that reacts with the metal surface.
- Contrary to what some textbooks may say, but often do not point out, all carbonates are bases and react with acids to form salts, the difference in reaction with alkalis or insoluble bases is that carbon dioxide gas is evolved.
- On adding a solid carbonate or hydrogencarbonate to an acid you see effervescence from carbon dioxide gas and the general word equation is ...
  - **metal carbonate** or **hydrogencarbonate + acid** ==> a **salt + water + carbon dioxide**
  - The obvious extra observation compared to the reaction with oxides or hydroxides is the production of a gas, but the acid is still neutralised in the process to form a salt e.g.
  - The white solid calcium carbonate (limestone) dissolves in dilute hydrochloric acid to form a **colourless** solution of calcium chloride and colourless carbon dioxide gas.
  - **calcium carbonate + hydrochloric acid ==> calcium chloride + water + carbon dioxide**

II. Complete the table.

VERB	NOUN	ADJECTIVE
	replacement	
		regenerative
to occur		
to accumulate		
	retention	
	appearance	
to enlarge		
		weak
	complication	
	coagulation	
to itch		
to forget		
	responsiveness	
		sensitive
to recognize		
	prevention	
to detect		
	reduction	
to change		

III. Translate and explain the use of *to-infinitive* in the following sentences.

1. Hippocrates, the father of medicine, observed in the 4th century BC that "whoever wishes to pursue the science of medicine must first investigate the seasons of the year and what occurs in them".
2. We all need fat in our diets – it helps to produce that comfortable feeling of fullness after meals, which delays the return of hunger and discourages overeating.
3. If you tend to eat, phone-jag, do homework, watch TV, etc. in bed, change your habits and only hit the sheets when you want to sleep.
4. Although science knows exactly what causes hiccups, a lot of research into the subject has failed to find a reason why some people are afflicted and others are not.
5. Drinking water often helps to soothe the stomach lining and the phrenic nerve stops being irritated.

6. If you are dying to develop stones in your gallbladder, enjoy downing a cup of coffee which increases bile flow.
7. When we listen to relaxing music our breathing tends to slow and our heart rate drops.
8. These changes help us feel less stressed and can help to lower blood pressure, boost our immune system and ease muscle tension.
9. Women tend to have less of the enzyme in the stomach which controls the first step in the metabolism of alcohol, thus they get more alcohol going through the small intestine which reaches the brain more rapidly.
10. A cup of chamomile tea is said to boost the immune system, making it easier for your body to ward off infections; the warmth alone can help unclog your sinuses, too.

IV. Translate and explain the use of *gerund* in the following sentences.

1. Avoid drinking too much tea or coffee whilst taking this product; if symptoms persist, consult your doctor.
2. Doctors admit obesity and being overweight as one of the major health hazards facing the rich nations of the world.
3. The vast majority of people consider caring about their weight for reasons of fashion and self-esteem rather than because they fear they are likely to risk their long-term health and well-being.
4. Computer users should avoid sitting in one position for several hours or performing the same hand motions without interruption.
5. Breathing is holy of holies of our organism; it is the music of our existence from the first cry to the last wheeze. Everything depends on breathing: blood composition, movements, senses, and mind.
6. Let's remember that each of us has an "alarm-clock" within him/her and doctors recommend keeping to it when we decide what should be done now and what would be delayed on another time.
7. We all created equal, the saying goes, but doctors suggest treating patients for coronary heart disease differently between the sexes. Moreover, too many research studies on prevention, diagnostic methods and intervention have been conducted in exclusively male populations.
8. Put simply, psychotherapy is a way of giving people the freedom to talk about themselves and their problems; that is why more and more British doctors resist prescribing drugs and prefer psychotherapy.
9. Half the population of Britain has high cholesterol levels. You may escape accumulating cholesterol including garlic in your diet.

V. Choose *to-infinitive* or *gerund* form in the following sentences.

1. Avoid *дивитися* TV before bed and especially in bed – the last should be reserved for two things only: sleep and romance.
2. I can't stand *потіти* on a hot day. But *потіння* is the way your body releases excess heat to stay cool.
3. I hate *хворіти.* Perhaps the worst part about it is having a fever.
4. Coffee reduces the risk of developing alcohol and non-alcohol related cirrhosis of the liver, however, it does not mean you can drink more alcohol if you drink coffee; keep *пити* both beverages in moderation.
5. Music that we love *слухати* makes us feel relaxed and impacts on us through its harmony, melody, rhythm and beat.
6. Cats are incredibly entertaining. They respond to touch and voice, and can keep you *сміятися* and *посміхатися* all day just by watching and interacting with them.
7. If you are a hardened hypochondriac, it's time for pulling yourself together and starting *усвідомлювати*, that excessive worrying is not likely to improve things.

8. Genetics are the forbidden fruit of science, and with knowledge of the genetic code, we can usurp God's role in creation; the public wants *знати* exactly what kind of genetic research is currently under way and where the governments will set its limits.
9. Often we speak to ourselves in ways we would never tolerate from anyone else. Your inner voice criticizes and blames you? Change it and start *розмовляти* to yourself nicely.
10. Do it now, appreciate *сміятися* – laughter produces endorphins (happy hormones) and white blood corpuscles, thereby giving your immune system a boost.

VI. Translate into Ukrainian. Put Questions to the underlined word combinations.

ANTIPYRETICS

Antipyretics are agents or drugs which reduce the temperature in febrile conditions. This can be brought about by physical means, i.e. by external cooling such as tepid sponging, baths, wet packs; by depressing the temperature-regulating centre (in the hypothalamus), e.g. salicylates. Antipyresis can be effected also by drugs which cause peripheral vasodilation by increasing the heat loss through dilatation of the cutaneous vessels and increased perspiration, e.g. alcohol, nitrates.

Although the antipyretic drugs were introduced into medicine for their antipyretic action, many of them are now used for their analgesic action.

The salicylates are the best known and the most widely used agents because of their comparatively low toxicity and their effectiveness in reducing headache and neuralgias, the chief representatives of this group are: salicylic acid, sodium salicylate, acetylsalicylic acid (aspirin).

The salicylates are powerful antipyretics lowering the point of thermal equilibrium through a depressant action on the heat-regulating centre in the hypothalamus. The augmented loss of heat from cutaneous dilatation and increased perspiration bring about the fall in temperature. Salicylates are absorbed rapidly from the small intestine. The excretion commences in 15 minutes and is completed within 12 to 24 hours. About 75% is eliminated by the kidney in the form of salicylates but a portion is oxidized to oxysalicylic acid and some is combined with glycuronic acid. Traces of salicylates will be found excreted in the salivary, gastric and sweat secretion. Moderate doses produce headache, nausea and vomiting, ringing in the ears and dullness of hearing, profuse perspiration, increased rapidity of the heart, and blurred vision. These symptoms subside if the dose is reduced.

During the therapeutic use of salicylates chronic salicylate poisoning (salicylism) may be encountered. The chief symptoms include headache, tinnitus, blurred vision, hyperpnoea, and mental disturbances. Acute salicylate poisoning usually results from the accidental ingestion or the consumption of a large dose of the drug for suicidal purposes. The symptoms include hyperpyrexia, hyperpnoea, ketosis and mental disturbances. Treatment consists of gastric lavage to remove any unabsorbed drug and the administration of fluids.

SULPHONAMIDES

With the introduction of the sulphonamides, chemotherapy with drugs highly toxic for some bacteria and relatively innocuous for man have become possible (since 1933). The basic compound for this group of drugs is para-aminobenzene sulphonamide or sulphanilamide.

The sulphonamides exert their inhibitory effect against a variety of organisms. Within a few hours after exposure of susceptible bacteria to the sulphonamide compounds, multiplication diminishes and some bacteria are killed. Susceptibility to the sulphonamides varies greatly among the various sentitive strains of bacteria, and even among the members of the same strain.

Following oral administration, a peak blood concentration reached in, for all the derivatives, from 1 to 6 hours. The following sulphonamide preparations are in general use: sulphanilamide, sulphapyridine, sulphathiazole, sulphadiazine, sulphamerazine, sulphamethazine, sulphacetamide, sulphapyrazine, sulphaguanidine, sulphasuxidine or succinylsulphathiazole, sulphathalidine.

Sulphanilamide is absorbed most and sulphadiazine the least rapidly, the other sulphonamides show intermediary degrees of absorption. The sodium salts are absorbed more rapidly and completely than their acid analogues. Absorption occurs for the most part in the small intestine and can be increased by administration of larger doses or adequate amounts of sodium bicarbonate. Since the presence of food has an impeding effect, absorption is delayed if the drugs are given after meal. Only sulphanilamide is absorbed from the rectum in significant amounts. Sulphanilamide and available sodium salts of the other absorbable sulphonamides can be given subcutaneously or intravenously. Following intravenous administration, high blood levels are immediately reached and sustained during administration, only to fall rapidly within a few hours. After subcutaneous injection, the blood concentration rises more slowly, and is prolonged. High blood levels are often found after deposition intraperitoneally and on or into wounds.

Контрольна робота 123

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

ALKALI METALS

The alkali metals, halogens and noble gases are three important groups in the periodic table.
The alkali metals are soft, reactive metals. They react vigorously with water and become more reactive as you go down the group.
The halogens are reactive non-metals. They become darker as you go down the group. Their reactivity decreases as you go down the group and their boiling points increase. A more reactive halogen will displace a less reactive halogen from solutions of its salts.
The noble gases are unreactive non-metals, which exist as single atoms.
The alkali metals have the following properties in common:

- they have low melting and boiling points compared to most other metals
- they are very soft and can be cut easily with a knife
- they have low densities (lithium, sodium and potassium will float on water)
- they react quickly with water, producing hydroxides and hydrogen gas
- their hydroxides and oxides dissolve in water to form alkaline solutions

The alkali metals - trends in reactivity

As you go down the group, the atomic number of the alkali metals increases, and their properties change:

- their melting points decrease
- their densities increase
- they become softer
- they become more reactive

You will probably see lithium, sodium and potassium at school, but rubidium and caesium are considered to be too reactive to use in the classroom. Francium is radioactive and very rare - there are only a few grams of it in the whole of the Earth's crust at any time.

Reactions of lithium, sodium and potassium with water

The hydroxides formed in all these reactions dissolve in the water to form alkaline solutions. These turn universal indicator purple - showing that the pH is more than 7.
The elements in group 7 are called the halogens. They belong to the column second from right in the periodic table. The halogens are all toxic, but this is a useful property. Chlorine is used to sterilise drinking water and water in swimming pools. Iodine is used in antiseptics to treat wounds.
Room temperature is usually about 20°C. At this temperature, fluorine and chlorine are gases, bromine is a liquid, and iodine and astatine are solids. You should remember this trend down the periodic table - the top two elements are gases, the bottom two are solids and the middle element is liquid.

Colour

The halogens become darker as you go down the group. Fluorine is very pale yellow, chlorine is yellow-green and bromine is red-brown. Iodine crystals are shiny purple-black but easily turn into a dark purple *vapour* when they are warmed up.

Displacement reactions in the halogens

You need to be able to explain what happens in halogen displacement reactions. A more reactive halogen can displace a less reactive halogen from its salt dissolved in water. Here's an example:

Displacement of bromine from sodium bromide

Chlorine is more reactive than bromine (you know this because chlorine is above bromine in group 7). Sodium bromide is a salt of bromine that will dissolve in water. So chlorine will displace bromine from sodium bromide solution.

This means that if chlorine (as a gas or dissolved in water) is added to sodium bromide solution, bromine forms and the mixture turns brown. We say that bromine has been displaced from sodium bromide. Displaced is just a chemist's word for pushed out. Here are the equations for the reaction:

chlorine + sodium bromide → sodium chloride + bromine

$Cl_2 + 2NaBr \rightarrow 2NaCl + Br_2$

You can see that the Cl and Br have swapped places. If you test different combinations of the halogens and their salts you can work out a reactivity series for the halogens. The most reactive halogen displaces all the other halogens from solutions of their salts, while the least reactive halogen is always displaced. It works just the same whether you use a sodium salt or a potassium salt.

Simulation

The simulation shows what happens when chlorine, bromine and iodine are added to various halogen salts. Note carefully what products are present in the test tube after each reaction.

II. Read and translate the text.

Allergy

The first exposure to an allergy-causing substance, known as an **allergen**, does not result in an allergic reaction. For unknown reasons, the immune system becomes sensitized to the substance and responds to subsequent encounters with an immune reaction. In a normal immune response, the body recognizes a foreign material, such as a virus or a toxin, as dangerous and develops antibodies to locate and destroy it. When the body again encounters that type of a particle or substance, the immune system is easily mobilized to destroy it.

The specific antibodies produced in an allergic reaction are known as **Immunoglobulin E** (IgE). These antibodies trigger the release of histamine and other chemicals when exposed to an allergen. Histamine is a chemical transmitter that can cause various changes in the body. For example, in the nose it causes blood vessels to dilate and become more permeable. In the lungs, histamine causes swelling of the airways that, if severe, can block breathing.

A particle or substance that triggers an allergic response is known as an allergen. Common allergens include dust, mould, pollen, drugs, animal dander, insect venom, poison ivy, food, heat, and cold. Heat and cold are not particles themselves, but it is thought that exposure to heat or cold triggers chemical changes in the body that the immune system responds to as if they were invading particles. Foods most likely to provoke an allergic response include cow’s milk, egg whites, peanuts and other legumes, nuts, and wheat.

Symptoms of an allergic reaction vary depending on the type of allergen, how it entered the system, and the location in the body at which contact occurred. An inhaled allergen can cause sinus congestion, runny nose, watery eyes, or wheezing and impaired breathing. An allergic reaction caused by contact between an allergen and the skin can result in itching, rash, or hives, raised itchy bumps on the skin. An allergic reaction to a food or a drug can greatly vary and may affect the entire body; reactions may include abdominal pain or upset, hives, swelling, or inability to breathe.

Children may inherit the tendency to become allergic from their parents, but only some of them will develop an active allergic disease. Children’s allergies can show up in different ways including: skin rashes (atopic dermatitis or eczema); asthma; allergic rhinitis (also known as “hay fever”); food allergies.

Allergic rhinitis is the most common of all childhood allergies. It causes runny, itchy nose, sneezing, postnasal drip and nasal congestion (blockage). The child with allergies may also have itchy, watery and red eyes and chronic ear problems. Despite its common name, “hay fever”, these allergy problems can occur at any time of the year – seasonally or year-round, and do not cause fever.

Allergies are the most common cause of chronic nasal congestion in children. Sometimes a child’s nose is congested (blocked) to the point that he or she breathes through the mouth,

especially while sleeping. This may also cause the child not to get a restful night sleep and then be tired the next day. If the congestion and mouth breathing are left untreated, they can cause abnormal changes the way the teeth and the bones of the face grow. Early treatment of the allergies causing the nasal congestion may prevent these problems.

Some allergic reactions may cause only minor distress, such as a runny nose or itchy eyes, while others may result in life-threatening conditions, such as an asthma attack or anaphylactic shock. **Anaphylactic shock** is a severe and often life-threatening allergic reaction. It can be triggered by bee or other insect stings or bites, certain drugs or foods, dyes used in diagnostic tests, or even a blood transfusion. Shock occurs when the allergic reaction triggers the blood vessels to dilate, causing circulatory failure and a drastic drop in blood pressure. Swelling of tissues in the throat may result in a blocked air passageway. Loss of consciousness may follow. Like other allergic reactions, anaphylaxis does not occur upon the first exposure to an allergen but only after prior sensitization.

Determining the cause of an allergic reaction often takes time and patience. Tests usually involve trial and error to see if a given possible allergen triggers a reaction. In a skin test, small amounts of a suspected allergen are placed on the skin of the upper arm or back. Either the skin is scratched to allow entry of the allergen or the allergen is injected. Swelling and redness at the test site are considered a positive result. Several allergens are usually tested at the same time. Skin tests have a wide margin of error, however. They are most reliable for airborne allergens. The Radioallergosorbent Test (RAST) measures the amounts of specific IgE antibodies in the bloodstream. The results are not immediately available.

If a food allergy is suspected, one food for a time is eliminated from the diet and then added back to determine if it is triggering an allergic reaction. Antihistamines are the drugs most often used to control symptoms of allergic reactions. A shot of epinephrine is given in the case of anaphylactic shock, and anti-inflammatory drugs are given in the case of an asthma attack. The most effective treatment is avoiding the allergen altogether. Allergy shots, or immunotherapy, can be administered to eliminate the allergy entirely. In immunotherapy, a small amount of an allergen is injected in order to stimulate the body to produce an antibody to neutralize it. This, in turn, blocks the IgE antibodies from reacting with the allergen and provoking the allergic response. The allergies for which shots are most effective include pollen, mould, insect bites, and animal hair.

III. Fill in the gaps with missing prepositions.

The best food ___ a newborn is mother's milk. However, some especially sensitive babies can have allergic reactions ___ foods their mothers eat. Babies can be tested ____ allergies. Eliminating these foods ___ the mother's diet may provide relief ___ the child.

As infants grow, their nutritional needs continue to change and your physician will advise when it is time ____ solid foods.

Cow's milk can cause allergies ___ children, but it is a good source ___ protein and calcium. Milk should be eliminated ____ a child's diet only if you are sure the child is allergic ___ it. Parents may suspect allergy if the child exhibits hives after the ingestion ____ milk or other dairy products. If you suspect your child may be allergic ____ milk, consult your physician, who may conduct appropriate tests to verify the allergy and prescribe the proper course ____ treatment _____ children allergies.

IV. Answer the following questions.

1. When does allergic reaction occur?
2. What are the most common allergens?
3. What are the symptoms of allergic reaction?
4. What may allergic reaction result in?
5. How is it possible to determine the cause of an allergic reaction?
6. What is the treatment for allergy?

What is anaphylactic shock?

V. Translate into English.

1. Алергія – гіперчутливість організму тварин чи людини до чужорідних речовин, що вводяться повторно.
2. Алергени можуть потрапляти в організм через шкіру і слизові оболонки або надходити в крові з вогнищ запалення.
3. Механізм виникнення алергії: як тільки алерген потрапляє в людський організм, на його знешкодження виділяється певна кількість антитіл, якщо в організмі є деякі розлади, то антитіл виділиться в надлишку, що призведе до виділення надмірної кількості високомолекулярних сполук, які і спричиняють розвиток алергії.
4. Молекули гістаміну у великих кількостях виділяються в кров, коли, наприклад, пилок рослин провокує імунну реакцію. І як наслідок – розширення судин, виділення рідини з дрібних судин, почервоніння шкіри. Це подразнює слизову оболонку носоглотки та викликає нежить і чхання.
5. Якщо один із батьків страждає на алергію, існує 25% вірогідність того, що у його дитини розвинеться алергія. Шанс захворіти на алергію збільшується до 75-80%, якщо на алергію страждають обоє батьків.
6. Алергія сама по собі – дуже неприємний стан. Сильний нежить, набряки, свербіж і почервоніння очей. При алергії підвищується стомлюваність, посилюється дратівливість, знижується імунітет. Алергія може провокувати різні захворювання, наприклад такі як: як екзема, гемолітична анемія, бронхіальна астма. Найсерйознішими із можливих проявів алергії – анафілактичний шок: утруднення дихання, судоми, втрата свідомості, значне зниження артеріального тиску, аж до загибелі людини.
   Головне у лікуванні алергічного стану – виявити саме той алерген, який викликає нездужання.

VI. Translate into English using Participle I or Participle II.

1. Алергія – це захворювання, яке може виникнути раптово, і так само раптово зникнути.
2. Людям, що страждають на алергію, рекомендують дотримуватися спеціальної дієти.
3. Алергік починає відчувати гострий неприємний біль в очах, подразнення в носі, що призводить до фізіологічного порушення дихання.
4. У світі існують підприємства, які виробляють товари саме для людей, що страждають на алергію.
5. Тим, у кого гіперчутливість до певних продуктів харчування, фахівці пропонують обрати індивідуальну дієту і не порушувати її.
6. Речовини, які викликають алергію (так звані алергени), здебільшого мають білкове походження.
7. Людина може страждати на сінну гарячку (полінозу), викликану пилком рослин.
   Алергія (від грец. allos – інший, ergon – діяльність, активність) – підвищена чутливість організму до дії деяких факторів навколишнього середовища (хімічних речовин, мікроорганізмів та продуктів їх життєдіяльності, харчових продуктів та ін), які називаються алергенами.

VII. Complete the sentences with proper words and phrases.

1. _____ must know what the patient's complaints and symptoms are.
2. _____ is not always understandable.
3. _____ of proper diet is useful.
4. A doctor will never perform an operation without _____ anatomy properly.
5. This _____ is my closest friend.
6. I like your idea of _____ this patient.

7. His _____ to the Congress of Gastroenterologists was useful to him.
8. _____ patients with gastritis is necessary at the in-patient department.
9. The patient was thankful to the doctor for _____ so attentive to him.
10. I remember _____ this interesting case.

(having been reported, his having been, being sent, examining, operating surgeon, knowing, using, the attending doctor, his reading rapidly, treating)

Контрольна робота 124

1. **Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).**

STREPTOMYCIN and other antibiotics

Streptomycin is the outcome of a systematic search for an antibiotic of value in the treatment of infections in which penicillin and sulphonamides have proved ineffective. The commercial product is a purified extract of the growth, on proper media of the mould *Streptomyces griseus.* It Is dispensed as sulphate, hydrochloride, trihydrochloride, calcium chloride, or phosphates.

Streptomycin is derived from *Adinotnyces* (resp. *Streptomyces) griseus,* and its great value lies in its bactericidal effect upon the tubercle bacillus. It is often effective, also, against coccal infections caused by *B. pyocyaneus, B. coli, B. proteus,* and *B. friedlanderi,* while in combination with sulphadiazine, it is effective in meningitis due to *B. influenzae.*

Unfortunately, streptomycin is more toxic than other antibiotics, and these effects are naturally more likely when it has to be used over a long period, as in the case of tuberculous meningitis and miliary tuberculosis. It may acount for persistent low fever and give rise to skin rashes, but its most injurious effect is on the nervous system, where it may damage the vestibular mechanism, interfere with vision, and lead to considerable mental impairment. During recovery from tuberculous meningitis, it is often difficult to decide whether damage to the nervous system is a legacy of the disease or a result of treatment. The intrathecal administration of streptomycin gives rise to a cell reaction and increase of protein in the cerebrospinal fluid, which may take several weeks to subside after treatment has been stopped. When used for infections other than tuberculosis, streptomycin can as a rule be discontinued after a week.

One disadvantage of streptomycin is that tubercle bacilli may become resistant to it, but the likelihood of this can be reduced by giving paraaminosalicylic acid (P.A.S.) by mouth.

Intrathecal injection of streptomycin is of value in meningeal infections. The usual intrathecal dose is 50 to 100 mg. (not to exceed 1 mg./kg. body-weight) every 24 to 48 hours.

Oral administration of streptomycin is ineffective in the treatment of systemic infections since 98% of the drug ingested is excreted in the faeces unchanged.

OTHER ANTIBIOTICS

Terramycin from *Sireptomyces rimosus* is a yellow, odourless crystalline powder and has actions similar to aureomycin. It has proved effective in pneumonia, whooping cough, urinary infections from E. coli and Gonococcus. It is used as an antibiotic and antiprotozoan. Dose — orally: 1 to 2 g daiLy, divided into 6-hourly doses. It is usually administered as terramycin hydrochloride. Toxicity: allergic reactions, nausea, vomiting, diarrhoea. Sometimes there may be nervous symptoms. Terramycin may bring about Vitamin K and Vitamin B complex deficiency. Terramycin is a proprietary brand of oxytetracycline.

Tetracycline. A yellow, odourless, crystalline powder with antibiotic activity against a wide range of organisms. It is usually administered as tetracycline hydrochloride. Dose — orally 1 g daily; intramuscularly 0.2-0.3 g daily; intravenously 0.5 g daily (every 12 hours); 3% cream for local dermal application (1-2 daily), for ophthalmic use (4-6 times daily) ointments are available.

It is used particularly in the primary bacterial pneumonia, acute cholangitis and cholecystitis, in infections of the urinary system. Toxic effects are vomiting, diarrhoea, allergic reactions. It is of no practical use in septicaemia.

Erythromycin (Ilotycin). An antibacterial substance produced by the growth of *Streptomyces erythreus,* occurring as white or slightly yellow crystals or powder. It is odourless with a bitter taste. It is easily soluble in alcohol and almost insoluble in water. It

is used in infections caused by Grampositive microorganisms (pneumococcus, staphylococcus, and streptococcus) particularly when the organism is resistant to other antibiotics or when the patient is allergic. Dose — only orally 0.2 g every 6 hours, in severe infections 0.3-0.5 g every 6 hours. In brucellosis usually administered in doses 1.2-2.4 g daily divided into three doses. Children are given 6-8 mg. per kg body weight every 6 hours. Erythromycin possesses little toxicity.

Erythromycin produces bactericidal and bacteriostatic action. In acute infections resistant to other antibiotics erythromycin lactobionate is administered intramuscularly or intravenously. In allergic patients erythromycin glucoheptonate is administered intravenously. There is also erythromycin stearate administered orally. It is resistant to the acid action of the gastric juice and it gives the same concentration in blood as the main erythromycin.

II. Read the text and answer the questions.

1. What is the most important risk factor for stroke?
2. Does the age influence the chance of having a stroke?
3. Cigarette smoking is an important risk factor for stroke, isn't it?
4. Do men or women have greater chance of stroke?
5. The chance of stroke is not greater in people who have a family history of stroke, is it?
6. What diseases increase a person's risk for having a stroke?
7. Are intravenous drug users at risk of stroke from cerebral embolisms?
8. What other factors affecting the risk of stroke do you know?

Risk Factors for Having a Stroke

Risk factors are things that increase the chance of having a stroke. Certain risk factors are important contributors to all types of strokes while other factors may favour a specific type of stroke.

High blood pressure is the most important risk factor for stroke. In fact, stroke risk varies directly with blood pressure. Effective treatment of high blood pressure may be the reason that death rates for stroke have greatly decreased in recent years.

Increasing age. The chance of having a stroke more than doubles for each decade of life after age 55.

Prior stroke. The risk of stroke for someone who has already had one is many times higher that of a person who has not.

Cigarette smoking. Cigarette smoking is an important risk factor for stroke. The nicotine and carbon monoxide in cigarette smoke damage the heart and blood vessels in many ways. The use of birth control pills combined with cigarette smoking greatly increases stroke risk.

Male sex. Overall, men have about a 20 per cent greater chance of stroke than women. Among people under age of 65, the risk for men is even greater when compared to that of women.

Heredity (family history) *and race*. The chance of stroke is greater in people who have a family history of stroke. African Americans have a much higher risk of death and disability from a stroke than people with light skin, in part because people with dark skin have a greater incidence of high blood pressure.

Diabetes mellitus is an independent risk factor for stroke and is strongly correlated with high blood pressure. While diabetes is treatable, having it still increases a person's risk of stroke.

Carotid artery disease. The carotid arteries in the neck supply blood to the brain. A carotid artery damaged by atherosclerosis (a fatty buildup of plaque in the artery wall) may become blocked by a blood clot and cause a stroke.

Heart disease. A diseased heart increases the risk of stroke. People with heart problems have greater than twice the risk of stroke as those without heart problems. Heart attack is also the major cause of death among survivors of stroke.

Atrial fibrillation (the rapid, uncoordinated beating of the heart's upper chambers) raises the risk for embolic stroke.

Transient ischaemic attacks are "mini strokes" that produce stroke-like symptoms but no lasting damage. They are strong predictors of stroke. A person who's had one or more TIAs is almost 10 times more likely to have a stroke than someone of the same age and sex who hasn't.

High red blood cell count. An increase in the red blood cell count is a risk factor for stroke. Excess of red blood cells thicken the blood and make clots more likely to form.

Cerebral aneurysms. Aneurysms are blood-filled pouches that balloon out from weak spots in the artery wall. They're often caused or aggravated by high blood pressure but can be congenital. Aneurysms aren't always dangerous, but if one bursts in the brain, a haemorrhagic stroke results. More common cause of stroke in those under 40 years.

Drug abuse. Intravenous drug users are at risk of stroke from cerebral embolisms. Cocaine use has been closely related to strokes and heart attacks. Some have been fatal even in first-time cocaine users.

Secondary risk factors that indirectly increase the risk of stroke by increasing the risk of heart disease include: high cholesterol; lack of exercise; and obesity.

Other factors affecting the risk of stroke:

Geographic location. Strokes are more common in the southeastern United States than in other areas. The same situation is in Ukraine.

Season and climate. Stroke deaths occur more often during extremes (hot or cold) of temperature.

Excessive alcohol intake. Excessive drinking (average of greater than one drink per day for women and more than two drinks per day for men) and binge drinking can indirectly lead to a stroke by raising blood pressure, contributing to obesity, and causing heart failure.

III. Use the appropriate conjunction given in brackets.

1. (**In case / unless**) ____ you wish to consult me, I'll be in the reception room.
2. (**If / even if**) ____ you wait here, the doctor will see you as soon as he is free.
3. You won't understand this grammar material ___ (**unless / if**) Mary helps you.
4. (**If / whether**) ____ she calls me or not, I'll not forgive her behaviour.
5. You are not allowed to go out ____ (**in the event / unless**) your blood pressure is within normal limits.
6. (**Even if / whether or not**) ____ Helen tries very hard, she won't get an excellent mark in English tomorrow.
7. (**If / unless**) ___ you go on smoking so much, you will ruin your health.
8. What will happen ____ (**in the case / whether or not**) she has a stroke?
9. (**If / unless**) ____ you don't know the meaning of a word, you may use a dictionary.

(**In the event / unless**) _____ you run fast, you will miss the train.

IV. Join the sentences and use the words in brackets.

Model: He suffers from persistent headaches. He takes over-the- counter headache medications daily. (**because**)

Because he suffers from persistent headaches, he takes over-the-counter headache medications daily.

1. He is going to get an adequate treatment. He'll stay in the hospital. (**while**)
2. We'll get to the hospital. We'll send a message. (**soon after**)
3. The patient suffering from multiple sclerosis was very week. He could not even speak. (**so that**)
4. Mary was in the neurological ward. I had left her there. (**where**)
5. Ann successfully graduated from the medical university. Parents rewarded Ann's efforts by giving her a trip to Paris. (**as**)

6. His application arrived after the deadline. They didn't enrol him on the staff of the neurology research institute. (**in as much as**)
7. Some methods of neuralgia treatment had failed. The doctor tried motor cortex stimulation. (**after**)
8. There are several possible methods of spinal nerve disorders treatment. Let's discuss all of them. (**as**)
9. A child is sometimes affected with spinal meningitis. Symptoms may include his refusal to stand or sit because it is painful. (**when**)
   Motor neuron disease affects about 5,000 people in the UK and there are 1,000 new cases a year. Scientists try to develop a gene therapy treatment for the most common form of motor neurone disease. (**since**)

V. Complete the table.

VERB	NOUN	ADJECTIVE
to neutralize		
	exposure	
		dangerous
to include		
		various
	response	
to impair		
		permeable
	congestion	
to invade		
to suspect		
	blockage	
to avoid		

VI. Read the text and fill in the gaps with the words from the table.

antibodies, chickenpox, immunity, infection, lymphocytes, microorganism, vaccinations, vaccine

We can trick the body into responding to an _____ without actually becoming ill. Do you remember going to the doctor to get _____ against _____, hepatitis B and measles when you were younger? Vaccines are "pretend" infections. The vaccine is either made from a very small amount of the dead _____ or the toxins that it makes. When you receive the vaccine the white blood cells (_____) identify them and begin to make antibodies against the infection, but because the microorganism is dead (or not even there), you do not get ill. Just as with natural _____, these antibodies stay in the bloodstream for a very long time. Therefore, when you are exposed to the live microorganism, _____ are produced rapidly and you will not become ill. This is known as artificial immunity. Many infections can now be avoided by being given the _____ for them before we come into contact with the live versions.

Контрольна робота 125

1. Translate the text into Ukrainian. Put 10 questions to the text (general, special, disjunctive, alternative).

Cheap metals can be used to make products from petroleum

The ancient alchemists sought to transform base metals, like lead, into precious gold. Now a new process developed at the University of Illinois at Chicago suggests that base metals may be worth more than their weight in gold -- as catalysts in the manufacture of countless products made from petroleum-based raw materials.

The process is described online in the *Journal of the American Chemical Society*. Pharmaceuticals, electronic components, plastics and fuels are just some of the goods based on petroleum, a hydrocarbon molecule. But to use petroleum, the chemical bonds between its hydrogen and carbon atoms must first be broken so that other elements can be added. Breaking those bonds -- other than by burning -- is a challenge to chemists.

"These carbon-hydrogen bonds are inert, and a catalyst is required to facilitate the chemical reactions that cause the bonds to break," says Neal Mankad,

UIC assistant professor of chemistry, who developed the process with his graduate student Thomas Mazzacano. Most catalysts used currently are scarce and expensive "noble" metals, such as platinum, palladium and iridium. They are also toxic, and difficult to completely remove from pharmaceuticals and other products for human consumption.

"These metals are used for one reason -- because they work really well, and there are few alternatives," Mankad said. "Finding safer and cheaper substitutes for these noble-metal catalysts is a major goal of modern chemistry."

Mankad has developed a way to use copper and iron together to replace the extremely rare metal catalyst iridium, which is used in a chemical process called borylation. Adding a boron atom to carbon is the first step in the synthesis of many products, from chemotherapy drugs to adhesives and polymers.

"Iridium is literally the least abundant element on the periodic table," Mankad said. "In fact, much of it comes from meteorites."

In the borylation reaction, iridium takes the two electrons that form the carbon-hydrogen bond and donates them to a boron atom to bind it to the carbon. In Mankad's process, copper and iron each react with one electron, and together transfer the two electrons from a carbon-hydrogen bond to form the carbon-boron bond.

"Base metals were never considered for these two-electron reactions like borylation," said Mankad. "Copper and iron, which are pretty cheap and abundant, when placed very close together, are able to take care of two-electron reactions, just like iridium."

Mankad thinks his base-metal catalysis technique can be applied to other reactions that transform organic material into useful end-products. His group is pursuing such applications and is working to make their strategy more practical to compete with traditional, noble-metal chemistry.

"Using copper and iron for catalyzing these reactions that are necessary for making so many of the things we rely on every day will benefit the environment and help bring costs down," said Mankad. "Copper and iron are abundant and cheap, and don't have to be so completely purified out of end products, unlike the noble metals, because they are less toxic."

II. Read and translate the text. Write about advantages and disadvantages of drug testing for patients. Say how drugs are tested in Ukraine.

I've heard that compassionate use is a way to get access to experimental treatments. How does it work?

In certain situations, the Food and Drug Administration (FDA) allows companies to provide their experimental drugs to people outside of clinical trials. This is referred to as compassionate

use. But getting access to not-yet-approved drugs through a compassionate use request can be a long and challenging process.

If you're interested in trying an experimental treatment, talk to your doctor about your options. For you to receive an experimental drug through the compassionate use program, your doctor must contact the drug company and then submit an application to the FDA. For the FDA to consider your request, you must meet certain criteria:

- Your disease is serious or immediately life-threatening.
- No treatment is available or you haven't been helped by approved treatments for your disease.
- You aren't eligible for clinical trials of the experimental drug.
- Your doctor agrees that you have no other options and may benefit from the experimental treatment.
- The company that makes the drug agrees to provide it to you.
- Your doctor feels you are healthy enough to tolerate this medication.

To find out more about the rules regarding compassionate use, visit the FDA website and search for "access to investigational drugs."

Another way to get access to experimental treatments is through expanded access studies. In these studies, experimental drugs in the later stages of clinical trials are offered to people who don't qualify for the clinical trials. To find out if a drug is available this way, contact the drug's manufacturer. Or go to ClinicalTrials.gov and search for "expanded access studies."

As you consider whether to try to obtain an experimental treatment, it's important to keep a few things in mind:

- **You aren't guaranteed to benefit.** Experimental drugs haven't been approved by the FDA, and their efficacy may not yet be proved.
- **The risks of the drug may be unknown.** Experimental drugs may not have been fully tested, so the range of side effects may be unknown.
- **Some companies don't give access to experimental drugs.** Drug companies aren't required to comply with your request for an experimental drug. The company you ask could refuse your request.
- **Your doctor may not agree with your request.** Your doctor might be unwilling to pursue your request if he or she thinks an experimental drug is dangerous or ineffective for your condition. You can ask for a second opinion from another doctor or seek advice from groups that advocate for people with your disease.
- **You may pay out of pocket for experimental treatment.**The drug company may charge you for the experimental drug. Also, your insurance company is unlikely to pay associated costs of your treatment, such as fees for your doctor to administer the experimental drug and monitor side effects.
- **Getting an answer may take time.** Unless your situation is an emergency, the review process may take some time. Because each compassionate use application is decided on a case-by-case basis, there is no set timeline and no one can predict how long you'll wait for an answer.

III. Complete the sentences with the verbs derived of the capitalized nouns. Translate into Ukrainian.

Hippocrates, an ancient Greek physician, is considered the most outstanding figure in the history of medicine. Hippocratic medicine was notable for its strict professionalism, discipline and rigorous practice. The Hippocratic work *"On the Physician"* _____ **(RECOMMENDATION)** that physicians always be kept well-intentioned, honest, calm, understanding, and serious. The Hippocratic school gave importance to the clinical doctrines of observation and documentation. These doctrines _____ **(DICTATION)** that physicians record their findings and their medicinal methods in a very clear and objective manner, so that these records may be passed down and employed by other physicians. Hippocrates made careful,

regular notes of many symptoms including complexion, pulse, fever, pains, movement, and excretions. He is said to have measured a patient's pulse when taking a case history to know if the patient lied. Hippocrates _____ **(EXTENSION)** clinical observations into family history and environment. To him medicine owes the art of clinical inspection and observation. For this reason, he may properly be termed as the father of clinical medicine.

Hippocratic medicine challenged the methods of many physicians who used magic and witchcraft to treat diseases. It taught that diseases had natural causes and could therefore be studied and cured according to the workings of nature with knowledge gained from medical writings or from experience. Modern medicine is still based on this assumption.

Hippocrates and his followers were the first to _____ **(DESCRIPTION)** many diseases and medical conditions. He began to categorize illnesses as acute, chronic, endemic, epidemic, and use terms such as *exacerbation, relapse, crisis, paroxysm, convalescence*. His teachings remain relevant to present-day students of pulmonary medicine and surgery.

IV. Complete the sentences with a word from the following common expressions.

bad *for your health* ***essential*** *for good health* ***health service*** ***harmful*** *to your health* ***do wonders*** *for your health* ***health hazard*** *to be* ***a picture of health*** ***glowing*** *with health* ***health warning*** ***healthy-looking***

1. Smoking is _____ for your health. So give up now!
2. A high fat diet is _____ to your health, so cut down on butter!
3. Vitamins and minerals are _____ for good health.
4. Increasing levels of pollution are becoming a major _____.
5. After three weeks of the exercise and diet regime, she was feeling fit and _____.
6. She likes to tell everyone she's dying, but she looks _____ to me!
7. Even the most _____ person could be carrying the AIDS virus.
8. Did you know that keeping a pet can do _____ for your health? It is a fact that people with cats and dogs visit the doctor less often than those who don't have pets.
9. In most countries cigarette packets carry a _____.
10. This country has an excellent _____.

V. Complete the sentences by choosing appropriate prepositions from the box. Translate the complete sentences into Ukrainian.

of, into, for, in, with, at, from, about, by

1. Our students must feel a joy ___ learning, and desire ___ the acquisition ___ knowledge ___ chosen field.
2. Learning ___ grades, swotting ___ tests cannot be accepted as the correct way ___ training.
3. Students must learn ___ the experience ___ teachers who are enthusiastic ___ their subject and benefit their profession.
4. Learning ___ grades must be replaced ___ learning ___ life.
5. The traditional end -___- year examinations may encourage the student ___ surface learning, and cannot adequately test deep learning.
6. Traditional learning may only be seen ___ a well-motivated student ___ a true professional attitude.
7. If the students work together ___ pairs, they will achieve a far higher degree ___ self-criticism than usually seen ___ traditional way ___tuition.
8. ___ the end ___ each module the depth ___ the student's knowledge is assessed.
9. ___ the end ___ the third year all medical students undertake a six-week practical course.

___ this three-year period medical students must become specialists ___ a definite number ___ medical procedures.

VI. **Put questions to the underlined words.**

1. Every year many young people enter higher medical schools.
2. The term of training at medical university is 5-6 years.
3. He passed Anatomy credit and acquired necessary knowledge.
4. The challenges of the 21st century call for a radical modernization of the system of education.
5. Ukrainian education is humanistic and based on the cultural, historical and spiritual heritage of the nation.
6. The state guarantees equal access to education for all Ukrainians.
7. For the first two years students go through the so-called "pre-clinical" training.
8. Clinical subjects are taught from the 3rd to the 5th year inclusive.
9. In their 6th year, the medical students are given practical training in 3 main clinical subjects – Internal Diseases, Surgery, Obstetrics and Gynaecology.

Upon completion of the 6th year, graduates receive their diplomas.

VII. Read the following text. Express your own opinion on the efficacy of development of the drinking water quality standards. Find out some information about the purity of drinking water in your country or the region you live.

Drinking Water Quality Standards

Drinking water quality standards describe the quality parameters set for drinking water. Despite the truism that every human on this planet needs drinking water to survive and that water can contain many harmful constituents, there are no universally recognized and accepted international standards for drinking water. Even where standards do exist and are applied, the permitted concentration of individual constituents may vary by as much as ten times from one set of standards to another. Many developed countries specify standards to be applied in their own country. In Europe, this includes the European Drinking Water Directive and in the USA the United States Environmental Protection Agency (EPA) establishes standards as required by the Safe Drinking Water Act. For countries without a legislative or administrative framework for such standards, the World Health Organisation publishes guidelines on the standards that should be achieved.

Where drinking water quality standards do exist, most are expressed as guidelines or targets rather than requirements, and very few water standards have any legal basis or are subject to enforcement. Two exceptions are the European Drinking Water Directive and the Safe Drinking Water Act in the USA, which require legal compliance with specific standards.

In Europe, this includes a requirement for member states to enact appropriate local legislation to mandate the directive in each country. Routine inspection and, where required, enforcement is enacted by means of penalties imposed by the European Commission on non-compliant nations. Countries with guideline values as their standards include Canada which has guideline values for a relatively small suite of parameters, New Zealand where there is a legislative basis but water providers have to make "best endeavours" to comply with the standards, and Australia.

Although drinking water standards are frequently referred to as if they are simple lists of parametric values, standards documents also specify the sampling location, sampling methods, sampling frequency, analytical methods and laboratory accreditation AQC. In addition, a number of standards documents also require calculation to determine whether a level exceeds the standard, such as taking an average. Some standards give complex, detailed requirements for the statistical treatment of results, temporal and seasonal variations, summation of related parameters, and mathematical treatment of apparently aberrant results.

The WHO guidelines include the following recommended limits on naturally occurring constituents that may have direct adverse health impact: Arsenic 0.010mg/l, Barium 10μg/l, Boron 2400μg/l, Chromium 50μg/l, Fluoride 1500μg/l, Selenium 40μg/l, Uranium 30μg/l.

For man-made pollutants potentially occurring in drinking water, the following standards have been proposed: Cadmium 3µg/l, Mercury 6µg/l. Organic species: Benzene 10µg/l, Carbon tetrachloride 4µg/l, 1,2-Dichlorobenzene 1000µg/l, 1,4-Dichlorobenzene 300µg/l, 1,2-Dichloroethane 30µg/l, 1,2-Dichloroethene 50µg/l, Dichloromethane 20µg/l, Di(2-ethylhexyl)phthalate 8 µg/l, 1,4-Dioxane 50µg/l, Edetic acid 600µg/l, Ethylbenzene 300 µg/l, Hexachlorobutadiene 0.6 µg/l, Nitrilotriacetic acid 200µg/l, Pentachlorophenol 9µg/l, Styrene 20µg/l, Tetrachloroethene 40µg/l, Toluene 700µg/l, Trichloroethene 20µg/l, Xylenes 500µg/l.