МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ
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Кафедра__иностранных языков и фармацевтической терминологии______
Полное наименование кафедры

УТВЕРЖДЕНЫ
решением кафедры
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МЕТОДИЧЕСКИЕ МАТЕРИАЛЫ ПО ДИСЦИПЛИНЕ
________________Б1.О.01 Иностранный язык______________
Шифр и полное наименование дисциплины

Направление подготовки 18.03.01 Химическая технология

Год набора: 2026

Пермь, 2025 г.

1. Рекомендации по подготовке к практическим занятиям.

Обучающимся следует:

- приносить с собой рекомендованную преподавателем литературу к конкретному занятию;
- до очередного практического занятия по рекомендованным литературным источникам проработать теоретический материал соответствующей темы занятия и отработать задания, определённые для подготовки к лабораторному занятию;
- при подготовке к лабораторным занятиям следует использовать не только лекции, но и учебную литературу;
- в начале занятий задать преподавателю вопросы по материалу, вызвавшему затруднения в его понимании.

Вопросы для самопроверки

Раздел 1. Обучение в Фармацевтической академии.

Вопросы для самопроверки по теме 1.1. «Семья и друзья студента»

1. What can you tell us about your family?
2. What term are you with your family in?
3. When and where did you finish school?
4. What was (were) your favorite subject(s) at school?
5. How many years did you study English at school?
6. When and why did you decide to choose a career of a pharmacist?
7. Who advise you to be a pharmacist?
8. Have you got brothers and sisters?
9. How many brothers and sisters have you got?
10. What are their names?
12. How old are they?
13. What term are you with your family in?
14. When and where did you finish school?

Вопросы для самопроверки по теме 1.2. «Рабочий день студента»

1. Do you plan your working day?
2. When do you get up?
3. What do you do in the morning?
4. What do you have for breakfast?
5. When does your working day begin?
6. How many pairs do you have a day?
7. How long does your working day last?
8. When do you leave academy?
9. How do you feel yourself after leaving academy?
10. Do you take part in out-of class activities?
11. What do you do in your spare time?
12. When is your working day over?
13. When do you go to bed?
14. What do you do in your spare time?

Вопросы для самопроверки по теме 1.3. «История академии»

1. What can you tell about the history of our academy?
2. How many departments does our academy have? What are they?
3. How long does the course of training run?
4. What subjects do the students study?

5. Where do the students have practice?
6. Where do the students live?
7. How do you plan your working day?
8. Do you take part in out-of class activities?
9. What do you do in your spare time?
10. What specialties do the students get after graduating from the academy?
11. Where may the students work after graduating from the academy?
12. What must pharmacist know?
13. What are the duties and the perspectives of a pharmacist?

Вопросы для самопроверки по теме 1.4. «Академия сегодня»

1. What academy do you study at?
2. What course are you in?
3. When was the pharmaceutical Institute founded?
4. When was the pharmaceutical Institute reorganized into academy?
5. How many departments does our academy have? What are they?
6. How long does the course of training run?
7. What subjects do the students study?
8. Where do the students have practice?
9. How do the students work with medicinal plants?
10. Where do the students live?
11. What specialties do the students get after graduating from the academy?
12. Where may the students work after graduating from the academy?

Раздел 2. Химическая лаборатория.

Вопросы для самопроверки по теме 2.1. «Оборудование и описание химической лаборатории»

1. Where is the chemical laboratory you make experiments situated?
2. What is a chemical laboratory?
3. How many rooms does the chemical laboratory consist of?
4. What are these rooms for? 43. What are they equipped with?
5. What branches of chemistry do the students of our academy study?
6. Where do the students carry out chemical experiments?
7. How many rooms does the chemical laboratory consist of?
8. What are these rooms for?
9. What are they equipped with?

Вопросы для самопроверки по теме 2.2. «Правила работы в лаборатории»

1. Do the students work in white gowns and hats in the laboratory?
2. What does the work in the chemical laboratory require?
3. What chemical processes will you deal with?
4. How do the students work with substances and reagents?
5. Why are the rules so important?
6. What are the rules for working at the lab?
7. Is it necessary to be accurate?

Вопросы для самопроверки по теме 2.3. «Описание проведения экспериментов в химической лаборатории»

1. What is the title of the experiment?
2. What are the objectives?
3. What equipment is used in the experiment?

4. What reagents are used in the experiment?
5. What is the result of the experiment?

Раздел 3. Великие ученые и их открытия.

Вопросы для самопроверки по теме 3.1. «Д. Менделеев»

1. What discovery did D. I. Mendeleyev make in 1869?
2. Why was it necessary to classify elements?
3. How were all the chemical elements classified before the discovery of the Periodic Law?
4. What became the basis for classification of the chemical elements by D. I. Mendeleyev?
5. What did D. I. Mendeleyev discover arranging all the known elements?
6. How is Mendeleyev's Periodic Law formulated?
7. How many periods are there in the System?
8. What element in the System has the atomic weight of unity?
9. What does each period consist of?
10. How do the metallic properties change within periods?
11. What is indicated in each box of the System?
12. How did Mendeleyev arrange periods?
13. How are vertical columns of elements called?
14. Elements of what subgroups possess stronger metallic properties?
15. What subgroups are called main and secondary ones?
16. How do properties of elements vary in the Periodic System?
17. Where were newly discovered elements placed in the Periodic System?
18. What is the practical importance of the Periodic Law?

Вопросы для самопроверки по теме 3.2. «М. Ломоносов»

1. When and where was M.V.Lomonosov born?
2. What did M.V.Lomonosov do at the age of 16^{th}?
3. In what field of science were general discoveries of the scientist?
4. Why and where was M.V.Lomonosov sent?
5. What did M.V.Lomonosov predict?
6. Where did M.V.Lomonosov repeat R. Boyle’s experiment?
7. What did M.V.Lomonosov think about the structure of matter?
8. What was M.V.Lomonosov the first to discover?
9. What may be said about M.V.Lomonosov as a linguist?
10. Did he work in the field of astronomy and other sciences?
11. What other fields of science interested M.V.Lomonosov?
12. Did M.V.Lomonosov take part in the foundation of Moscow University?

Вопросы для самопроверки по теме 3.3. «Великий учёный (на выбор студента)»

1. When and where was the scientist born?
2. What family was he born in?
3. What did he get interested at his early school age?
4. What have you learnt about his education?
5. What University did he enter after finishing school?
6. What kind of student was he?
7. What field of science did he work in?
8. What problems did he study?
9. What field of science were general discoveries of the scientist in?
10. What is the main idea of the discovery?

11. What scientific degree did he get?
12. What was the practical importance of the discovery?
13. What was the attitude towards his discoveries abroad?
14. Was he awarded the Nobel Prize?
15. What significance had the scientific activity of the scientist for the world science?

Вопросы для самопроверки по теме 4.1. «Химия как наука»
1. What is chemistry?
2. What is chemistry concerned with?
3. What physical and chemical properties do you know?
4. How many states of aggregation does matter have? What are they?
5. How does temperature influence the substance?
6. How are chemical products used in everyday life?
7. What main aspects does chemistry have?
8. What are the main divisions of chemistry?
9. What do organic and inorganic chemistries deal with?
10. What is the importance of chemistry?
11. What are the categories of chemistry?
12. How are the substances divided?
13. What kinds of chemistry are taught at our Academy?
14. What does organic chemistry study?
15. What does chemical technology study?

Вопросы для самопроверки по теме 4.2. «Периодическая система Д.Менделеева»
1. What discovery did D. I. Mendeleyev make in 1869?
2. Why was it necessary to classify elements?
3. How were all the chemical elements classified before the discovery of the Periodic Law?
4. What became the basis for classification of the chemical elements by D. I. Mendeleyev?
5. What did D. I. Mendeleyev discover arranging all the known elements?
6. How is Mendeleyev's Periodic Law formulated?
7. How many periods are there in the System?
8. What element in the System has the atomic weight of unity?
9. What does each period consist of?
10. How do the metallic properties change within periods?
11. What is indicated in each box of the System?
12. How did Mendeleyev arrange periods?
13. How are vertical columns of elements called?
14. Elements of what subgroups possess stronger metallic properties?
15. What subgroups are called main and secondary ones?
16. How do properties of elements vary in the Periodic System?
17. Where were newly discovered elements placed in the Periodic System?
18. What is the practical importance of the Periodic Law?

Вопросы для самопроверки по теме 4.3. «Химический элемент»
1. What are the most useful elements ?
2. What is the history of the element’s discovery?
3. Where did the element come from?
4. What is the symbol of the element?
5. What are the physical properties of the element?
6. What are the chemical properties of the element?
7. What are the typical chemical reactions of the element?
8. How can you distinguish the presence of that element?

9. Characterize the place of the element in the Periodic Table?
10. What is the practical importance of the element?
11. How is the element used in medicine?
12. What are the most rare elements?
13. Characterize the element according to the scheme?
14. What historical data about the discovery of Mendeleev's table do you know?
15. Is the element of vital importance? Prove.

Вопросы для самопроверки по теме 5.1. «Моя будущая профессия – хим.технолог»
1. What is your future profession?
2. Why have you decided to become a chemical technologist?
3. What is your future specialization as a chemical technologist?
4. What are the possibilities of your future career path?
5. What are your priorities?
6. Where can you work after graduating from the Academy?
7. What functions does the work of a chemical technologist include?
8. Why are chemical technologists expected to become more integral with the health care system?
9. What can you say about working conditions of chemical technologist?
10. What is the working place of a chemical technologist equipped with?

Вопросы для самопроверки по теме 5.3. «Возможности карьеры»
1. What does the field of chemical technology focus on?
2. Which areas does chemical technology include?
3. Which areas of specialization do people choose from if they vote for chemical technology careers?
4. What does working in the chemical technology field start with?
5. What are the job duties of a chemical technologist?
6. What should specialist do for staying on top of what is happening in the field?
7. Which specialist can you be in the chemical technology field?
8. What are the job duties of a chemical technologist in the lab?
9. What are the job duties of a chemical technologist in the office?
10. What are the job duties of a chemical technologist in the field?

1.2. Вопросы для самопроверки по грамматике английского языка:

1. Порядок слов в простом английском предложении.
2. Порядок слов в простом вопросительном предложении.
3. Типы вопросительных предложений.
4. Характеристика подлежащего.
5. Чем выражается подлежащее в предложении.
6. Характеристика сказуемого.
7. Основные признакми сказуемого (глагол в личной форме, вспомогательные глаголы).
8. Как согласуется подлежащее со сказуемым.
9. Структура отрицательных предложений.
10. Образование времен глагола.
11. Образование действительного и страдательного залога.
12. Спряжение глаголов to be, to have, to do.
13. Модальные глаголы и их эквиваленты.

1.3. Типовые задания по основным грамматическим темам:

Упражнение 1. Поставьте глагол “to be”/“to have” в правильную форму, согласовав его с подлежащим. Предложения переведите.

1. She __was ___a schoolgirl last year. В прошлом году она была школьницей.
2. We ________the first-year students of the pharmaceutical academy.
3. I ______many different books in chemistry
4. Chemistry _____ a difficult subject.
5. He _____ a laboratory worker at a chemical plant before entering the Academy.
6. We ______practical classes every day.
7. They _____English class yesterday
8. Our students _____two hours of chemistry tomorrow
9. His house ______far from the Academy
10. I ____ present at the conference last year
11. My friend ______ only good marks in chemistry
12. We _______pharmacists in five years

Упражнение 2. Заполните пропуски глаголом to do (do, don’t, does, doesn’t) в Present Simple, согласовав его с подлежащим. Предложения переведите.

1. The girls like chemistry, but they ___don’t___ like math.
Девушки любят химию, но не любят математику.
2. How often _______ you visit your parents during academic year.
3. This plant _________ grow in Britain.
4. Noble gases_______ react much with other elements.
5. What _______ a healthy lifestyle look like.
6. The students of our university ____________have much free time.
7. ________ he follow all these steps to solve the problem.
8. What all humans________ have in common is the genome.
9. Cutting herbs ________ make you cry.

Упражнение 3. Поставьте глагол в Present, Past, Future Simple, используя показатели времени в скобках.

1. We (to see) her (every day; last week; next week).
I see her every day. I saw her last week. I will see her next week.
2. She (to listen to) lecturers attentively (always; tomorrow; yesterday).
3. Many students (to graduate) from the Academy (every year; last year; in 5 years).
4. My friend (to give) me his books (always; some days ago; in some days).
5. We (to learn) many new things (every day, at the last lesson, at the next lecture).
6. I (to send) E-mail(s) to my parents and friends (every month, the day after tomorrow, the day before yesterday).
7. My friend (to become) a pharmacist (last year, in five years).

Упражнение 4. Выберите предложения, сказуемые которых стоят в Passive Voice. Сказуемые подчеркните и предложения переведите под соответствующим номером.

1. The pharmaceutical students carry out many experiments during their studies. 2. Chemical laboratories *are equipped* with different apparatuses. 3. The work at the botanical stations helps the students to acquire deep knowledge of botany and pharmacognosy. 4. Thousands of future specialists are trained at higher educational establishments. 5. Positive effect was associated with the low temperature. 6. Chemical and physical properties of inorganic substances were thoroughly studied during practical classes in chemistry. 7. Medicinal herbs were collected during our practice at botanical stations. 8. The industrial revolution of the 20 th century gave birth to synthetic organic chemistry. 9. Some preparations

which were known to primitive men are still used at present in a modified form. 10. Drug effects will be described after a number of experiments.

Упражнение 5. Заполните пропуски модальными глаголами: can, must, may, should. Переведите предложения.

1. Before we entered the chemical laboratory we (должны) ________________ put on white gowns.
2. Different parts of the plant such as roots, rhizomes, fruits, bark, seeds, flowers (могут) __________________ be used for medicinal purposes.
3. The first-year students (могут) __________________ carry out complex experiments with medicinal substances in four years.
4. The first-year students (могут) _______________ carry out complex experiments with inorganic substances.
5. The reagents (должны) ___________________ have a label with the name and (должны) ______________be closed with a stopper.
6. During storage too much moisture (может) ___________________ increase the weight of the compound and affect its active constituents.
7. You (должны) ______________ keep the mixture in a cool place.
8. For the determination of vitamin B1 he (следует) ______________________ dilute the tested solution with water.
9. Your sister (сможет) ____________________ work at the chemical laboratory in some years after graduating from the Academy.
10.

Упражнение 6. Составьте предложения из слов, учитывая порядок слов в английском утвердительном предложении.

1. made / oxygen / is / atoms / of / an / molecule / two

An oxygen molecule is made of two atoms

2. sticks / the / together / forms / and / slowly / dust / planets / the

3. see / bench / any / on / cannot / flasks/ we / the

4. systems / all / same / living / characteristics / the / have

5. theory/ not / some / agree / cosmologists / with / do / this

6. work / organism / the / together / many / systems / human / includes / open / that

7. computer / goes / afternoon / to / lab / Tuesday / seldom / the / on / she

Упражнение 7. Поставьте предложения в отрицательную форму.

1. The chemist is determining the constituents of water.

The chemist isn’t determining the constituents of water

2. I am heating hydrogen in the tube

3. They are studying chemistry now

4. The analyst is still working in the laboratory

5. They were making experiments from 5 to 8 o’clock in the lab yesterday.

6. They will be studying these elements all day long tomorrow.

7. When I entered the laboratory the students were finishing their work.

Упражнение 8. Поставьте вопросы к выделенным словам, используя вопросительные слова в скобках

1. On Thursday Jack has Physiology and English. (What) *What does Jack have on Monday?*

2. They will work in the pharmacy on graduating from the Academy. (When)

3. He wants to enter the University to study pharmacy. (Who)

4. Albert Einstein moved to Switzerland to study. (Where)

5. Our planet is a tiny mass vibrating in a sea of plasma. (What)

6. The salt was decomposing with evolution of ammonia for 2 hours. (How long)

7. Positive-negative charges attract each other. (What charges)

8. Clinical trials of the drug had to be stopped because of severe side-effects. (Why)

Упражнение 9. Проанализируйте предложения, определив, какими членами предложения являются выделенные и обозначенные цифрой слова и обозначьте их соответственно: а) подлежащее; б) сказуемое; в) определение; г) дополнение; д) обстоятельство; е) часть сказуемого. Переведите предложения.

1. Many herbs used[1] for making medicines are cultivated[2] in this place.

1) – в; 2) – е Многие травы, используемые для изготовления лекарств, выращивают в этом месте

2. To determine the sensitivity[1] of this preparation is[2] very important.

3. To obtain[1] a very pure product the water used[2] was distilled[3].

4. The precipitate formed[1] in the tested[2] solution contained[3] poisonous substances.

5. Having been done[1] in time, the experiment was considered[2] successful.

6. If taken[1] properly this medicine is very effective.

7. Being a solvent[1] water often contains[2] impurities either in suspended or dissolved[3] state.

Упражнение 10. Подчеркните в каждом предложении глагол-сказуемое, подсчитайте, из скольких слов оно состоит. Укажите цифру для каждого предложения. Предложения переведите.

1. Two admixtures have been identified. (_3_) _Были определены две примеси.

2. The metal has been subjected to heat treatment. (__)

3. The viscosity of this liquid is to be measured. (__)

4. Every wire carrying an electric current has a magnetic field. (__)

5. Fast neutrons can penetrate any material. (__)

6. The oils from Roman chamomile possessed the highest antioxidant activity. (__)

Упражнение 11. Подчеркните слова, которые являются подлежащими. Предложения переведите.

1. For practical reasons the influence of space charge will not be taken into consideration. В практических целях влияние объемного заряда не будет учитываться.

2. Many methods for detection of uranium have been proposed for use under various conditions.

3. As indicative of the relative effect of temperature and pressure on the deformation rate the corresponding curves are almost coincident.

4. It has become possible to modify the invention so as to bring out the features more clearly.

5. It takes the rays of the Sun 8 minutes to get to the Earth.

6. To test the accuracy of the method is our main task.

7. Falling is a case of motion at constant acceleration.

8. His heating copper wire from 0° to 100°C increased its resistance about 40 per cent.

2. Рекомендации по подготовке к ролевой игре.

Ролевая игра - совместная деятельность студентов и преподавателя с целью решения учебных и профессионально-ориентированных задач путём игрового моделирования реальной проблемной ситуации, позволяет оценивать умение анализировать и решать типичные профессиональные задачи.

Ролевая игра по теме 3.3 «Великий учёный (на выбор обучающегося)» предполагает следующие этапы:

1. Выбор материала.

2. Работу с материалом, чтение, перевод.

3. Отбор и обработку материала с опорой на нижеприведенную схему.

	was the founder of….
	was born
	came from the family of…
	was interested in…
	studied
	entered
	graduated from
Great scientist	was granted the degree(master's bachelor's, doctor's)
	investigated researched tested described invented discovered carried out
	became famous for…
	was awarded with (prize, medal)
	was buried

Текстовые материалы к учебной конференции по теме 3.3. «Великий ученый (на выбор обучающегося)».

Edward Jenner

The English physician Edward Jenner introduced vaccination against smallpox. His curiosity about natural phenomena and dedication to medicine earned him status as a pioneer of virology and immunology, as well as the founder of the preventive medicine.

In 1770 young Jenner went to London to study surgery and anatomy under the surgeon, anatomist and naturalist John Hunter. John Hunter was a noted experimentalist and a member of Royal Society. He recommended Jenner for the position of naturalist but Jenner chose the medical career. Hunter's experimental methods, insistence on exact observations resulted in Jenner's introduction of vaccination.

Practice inoculation reached England by the 18th century. Despite of the risk of inoculation people wanted to be vaccinated as quicker as possible. Although inoculation aided in the prevention of the disease it was dangerous. During Jenner's lifetime, smallpox was a common and often fatal disease. Due to observations young physician Jenner put forward theory about the prevention of smallpox. Dairy workers often from cowpox, a disease like smallpox only milder. Earlier cases of cowpox seemed Jenner immune to the most severe infection. The more Jenner was sure in his observations the quicker he wanted to obtain immunity to smallpox.

Jenner removed the fluid of cowpox from dairymaid and inoculated an eight-year old boy. Six weeks later he inoculated the boy with smallpox. The boy was healthy. Jenner proved his theory and called it vaccination. The demand for the vaccine increased and Jenner was honoured and respected throughout Europe and the United States. The Russian Queen Katherine the Great was the first to be vaccinated in Russia. Nearly two centuries after Jenner's experimental vaccination of young boy the World Health Organization (WHO) declared smallpox to be eradicated.

Joseph Lister

Joseph Lister was an English surgeon and pioneer of antisepsis. Working at Edinburgh, he was also appointed a professor of clinical surgery at Glasgow, where he was one of the few to understand the implications of Louis Pasteur recent work on fermentation and the beginnings of the germ theory.

When Joseph Lister was a student at Edinburgh, he decided not only to practice medicine, but also to conduct research to improve medical knowledge. Lister's research required considerable sacrifice and dedication, as it was undertaken at night after a full working day in the hospital.

In Edinburgh Hospital where Lister worked, almost half of the surgery patients died from infections. Surgeons thought that it could nothing be done about these infections, because they arose spontaneously inside the wound. In order to prevent infection Lister began to search the solution of the most actual problem of that time. He studied the work of European bacteriologists, notably that of Louis Pasteur. When he read Pasteur's work on germs he immediately applied Pasteur's thinking to the problem he investigated. He concluded that inflammation was the result of germs entering and developing in the wound. Since Pasteur's sterilization by heat could not be applied to the living organism, Lister was looking for a chemical substance to destroy the germs. He learned that carbolic acid was used as an effective disinfectant and could be safely used for human body.

Facilities for washing hands or the patient's wounds did not exist and it was even considered unnecessary for the surgeon to wash his hands before he saw patient. 14. Lister was of another opinion, he used carbolic acid to wash his hands, his instruments and the bandages used in the operation.

The more he used these techniques the more sufficient data to show that his methods were a success Lister had. This led to the rise of sterile surgery. Some consider Lister "the father of modern antisepsis".

However, widespread acceptance of Lister's procedure was rather slow, as is often the case with revolutionary new ideas. Joseph Lister's behavior with his patients was quite a contrast to those surgeons who believed that such involvement would somehow lessen the respect of patients to their doctors. Over the next 12 years Lister continued to develop new surgical techniques by applying his antiseptic principle. In 1880 he introduced catgut for internal stitches. In later years, Joseph Lister was given he most prestigious positions by the scientific community in recognition of his contribution to medicine.

Louis Pasteur

Louis Pasteur was a French chemist and microbiologist best known as one of the founders of germ theory and bacteriology. He found a key to make medicine a science as well as an art.

For thousands of years before Pasteur, doctors were helpless in the face of disease. It was believed that only symptoms could be treated, not the cause of the disease and the diluted drug solution were used. This system was the main obstacle to the progress of medicinal chemistry. Finally, this theory was completely reversed by Louis Pasteur. He thought that all diseases are caused by pathogenic parasites. From that time Pasteur directed all his experimental work toward the problem of immunization and applied this principal to many diseases. It is often said that English surgeon Edward Jenner discovered vaccination and that Louis Pasteur invented vaccines. These discoveries revolutionized work in infectious diseases. Pasteur focused on microbial origin of disease. His investigations of animals infected by pathogenic microbes and his studies of the microbial mechanisms that cause harmful physiological effects in animals made him a pioneer in the field of infectious pathology. In 1882 Louis Pasteur decided to attack the problem of rabies. The more mysterious origin of this horrible disease was the more it fascinated imagination of people for centuries. As the microbe that caused rabies was the smallest one that could be seen under Pasteur's microscope, experimentation with the disease demanded the development of new methodologies. Pasteur conducted his experiments using rabbits and transmitted the infectious agent from animal to animal until he obtained a stable preparation. In 1885 Pasteur vaccinated a nine-year-old boy who was bitten by a rabid dog. The vaccine was so successful that it brought immediate glory and fame to Louis Pasteur. Hundreds of other bite victims throughout the world were saved by Pasteur's vaccine, and the era of preventive medicine began.

Another thing Louis Pasteur did was the invention of method to stop milk and wine from causing sickness. The process of gentle heating was given the name pasteurization and it saved the French wine industry. Later it was also adapted to milk production, to juice preservation and to many other food preservation technologies. During Pasteur's career, he touched on many problems, throughout his life he was an effective observer and understood that future would belong to those who made much for suffering humanity.

Alexander Fleming

The Scottish bacteriologist Alexander Fleming is the well known for his discovery of penicillin. It was the greatest contribution of medicinal science ever made to humanity. Alexander Fleming was born in Scotland in August in 1881. Nature was considered by him as the first and the best teacher. Nature developed his power of observations and taught him to apply and to act according to observations.

Like many Scotts Alexander Fleming left his native land for better career opportunities. In 1895 he went to London where he decided to dedicate his life to medicine. He chose a career in bacteriology. Alexander Fleming assisted Almroth Wright, the founder of vaccinotherapy. Almroth Wright was the first to use vaccines on human beings. Under the influence of Almroth Wright Fleming became interested in bacterial action and antibacterial drugs. The more knowledge Fleming obtained in the fields of anatomy, bacteriology the more he was sure in the right choice of his profession. The need for further research in these fields excited his mind. After graduating from the London University Alexander Fleming was considered as outstanding as he was able to become a member of teaching and research staff of St. Mary's hospital.

After military service he returned to laboratory work and was engaged in developing antiseptics. Fleming conducted experiments that later focused his attention to the properties of penicillin. The leitmotiv of Fleming's career was his search for a chemical substance which would destroy infections bacteria without destroying tissues or weakening the body's defenses. Once Fleming noted that his experiment was ruined by an accident. Fleming noted that on a culture plate of staphylococci a mould which was introduced by accidental contamination had dissolved the colonies of staphylococci. He found that the bacterial substance produced by the mould was unstable and rapidly lost its activity. The blue mould was in fact the natural form of penicillin which Fleming realized was an effective way of killing bacteria. A few years later, penicillin was mass-produced. The accident led to one of the greatest medical discoveries of modern times. Alexander Fleming's discovery of penicillin did more to help suffering people than anything else for centuries.

Henry Cavendish

Henry Cavendish, (10 October 1731 - 24 February 1810) was a British scientist noted for his discovery of hydrogen or what he called "inflammable air" He described the density of inflammable air, which formed water on combustion, in his work "On Factitious Airs" in 1766. Antoine Lavoisier later reproduced Cavendish's experiment and gave the element its name. Cavendish is also known for the Cavendish experiment, his measurement of the Earth's density, and early research of electricity. The English physicist and chemist Henry Cavendish determined the value of the universal constant of gravitation, made noteworthy electrical studies, and is credited with the discovery of hydrogen and the composition of water.

Henry Cavendish was born in Nice, France, on October 10, 1731, the oldest son of Lord Charles Cavendish and Lady Anne Grey, who died a few years after Henry was born. As a youth he attended Dr. Newcomb's Academy in Hackney, England. Cavendish was silent, and solitary, viewed as somewhat eccentric, and formed no close personal relationships outside his family. He entered Peterhouse, Cambridge, in 1749, but left after three years without taking a degree.

Cavendish returned to London, England to live with his father. There, Cavendish built himself a laboratory and workshop. When his father died in 1783, Cavendish moved the laboratory to Clapham Common, where he also lived. He never married and was so reserved that there is little record of his having any social life except occasional meetings with scientific friends.

Contributions to chemistry. During his lifetime, Cavendish made notable discoveries in chemistry, mainly between 1766 and 1788, and in electricity, between 1771 and 1788. In 1798 he published a single notable paper on the density of the earth. At the time Cavendish began his chemical work, chemists were just beginning to recognize that the "airs" that were evolved in many chemical reactions were clear parts and not just modifications of ordinary air. Cavendish reported his own work in "Three Papers Containing Experiments on Factitious Air" in 1766. These papers added greatly to knowledge of the formation of "inflammable air" (hydrogen) by the action of dilute acids (acids that have been weakened) on metals.

Cavendish's other great achievement in chemistry is his measuring of the density of hydrogen. Although his figure is only half what it should be, it is astonishing that he even found the right order. Not that his equipment was crude; where the techniques of his day allowed, his equipment was capable of precise results. Cavendish also investigated the products of fermentation, a chemical reaction that splits complex organic compounds into simple substances. He showed that the gas from the fermentation of sugar is nearly the same as the "fixed air" characterized by the compound of chalk and magnesia (both are, in modern language, carbon dioxide).

Another example of Cavendish's ability was "Experiments on Rathbone-Place Water"(1767), in which he set the highest possible standard of accuracy. "Experiments" is regarded as a classic of analytical chemistry (the branch of chemistry that deals with separating substances into the different chemicals they are made from). In it Cavendish also examined the phenomenon (a fact that can be observed) of the retention of "calcareous earth" (chalk, calcium carbonate) in solution (a mixture dissolved in water). In doing so, he discovered the reversible reaction between calcium carbonate and carbon dioxide to form calcium bicarbonate, the cause of temporary hardness of water. He also found out how to soften such water by adding lime (calcium hydroxide).

One of Cavendish's researches on the current problem of combustion (the process of burning) made an outstanding contribution to general theory. In 1784, Cavendish determined the composition (make up) of water, showing that it was a combination of oxygen and hydrogen. Joseph Priestley (1733–1804) had reported an experiment in which the explosion of the two gases had left moisture on the sides of a previously dry container. Cavendish studied this, prepared water in measurable amount, and got an approximate figure for its volume composition.

Humphry Davy

Humphry Davy was born on December 17, 1778, in Penzance, Cornwall, to middle-class parents. He was well educated but he was also naturally intelligent and curious and those traits often manifested in the fiction and poetry he wrote at an early age. Davy was also deeply interested in nature, and he was a fisherman and collector of minerals and rocks. He was educated at the grammar school in nearby Penzance and, in 1793 at Truro. In 1795, a year after the death of his father, Robert, he was apprenticed to a surgeon and apothecary, and he hoped eventually to qualify in medicine.

He began the serious study of science in 1797, when his friend Davies Giddy offered him the use of his library in Tradea and took him to a chemical laboratory that was well equipped for that day. There Davy formed strongly independent views on the nature of heat, light, and electricity and the chemical and physical doctrines of A.-L. Lavoisier. In his small private laboratory, he prepared and inhaled nitrous oxide (laughing gas), in order to test if it caused diseases. In 1798 he was appointed the chemical superintendent of the Pneumatic Institution, founded at Clifton to inquire into the possible therapeutic uses of various gases. Davy attacked the problem with characteristic enthusiasm, evincing an outstanding talent for experimental inquiry. He investigated the composition of the oxides and acids of nitrogen, nearly lost his own life inhaling water gas, a mixture of hydrogen and carbon monoxide sometimes used as fuel. The account of his work, published as Researches, Chemical and Philosophical (1800), immediately established his reputation, and he was invited to lecture at the newly founded Royal Institution of Great Britain in London. With that work, Davy got recognition and became a professor of chemistry at the Royal Institution of Great Britain two years later. Davy's personal charisma and charm made his scientific presentations to the public at the Royal Institution of Great Britain extremely popular among Londoners of the day.

At that time, Davy proved that diamond is a form of carbon. Shortly after his return, he made investigations for the Society for Preventing Accidents in Coal Mines. This led to the invention of the miner's safety lamp and to subsequent researches on flame, for which he received the Rumford medals (gold and silver) from the Royal Society. Davy's health was failing rapidly. After a last, short visit to England, he returned to Italy, settling at Rome. Though partly paralyzed through stroke, he spent his last months writing a series of dialogues, published after his death as "The Last Days of a Philosopher"

Davy was a pioneer in the field of electrolysis using the battery to split up common compounds and thus prepare many new elements. In 1810, chlorine was given its current name by Humphry Davy, who insisted that chlorine was in fact an element. He also showed that oxygen could not be obtained from the substance known as oxymuriatic acid (HCl solution). This discovery overturned Lavoisier's definition of acids as compounds of oxygen.

Ролевая игра по теме 4.3. «Химический элемент» проводится в форме научно-практической конференции.

Результативность ролевой игры во многом зависит от особенностей ее организации, проведения, а также тщательности самостоятельной подготовки обучающегося.

Самостоятельная подготовка обучающихся к игре включает составление доклада по выбранному химическому элементу и сопровождение его презентацией.

Компьютерную презентацию, сопровождающую выступление докладчика, удобнее всего подготовить в программе MS PowerPoint. Презентация как тип документа представляет собой последовательность сменяющих друг друга слайдов. Количество слайдов адекватно содержанию и продолжительности выступления (например, для 5-минутного выступления рекомендуется использовать не более 10 слайдов).

На первом слайде обязательно представляется тема выступления и сведения об авторах. На следующих слайдах выносится опорный конспект выступления и ключевые слова с тем, чтобы пользоваться ими как планом для выступления.

Примерный план выступления приводится ниже:

1. Discovery (names of scientists, dates, experiments).
2. Position in the Periodic Law (period, series, group, subgroup, symbol, name, ordinal number, atomic weight, electron formula).
3. Occurrence in nature (free or combined state, abundance (distribution), deposits).
4. Physical properties (odour, olour, taste, b. p., m. p, state of aggregation, other properties).
5. Chemical properties (chemical activity, main reactions, main compounds, other properties).
6. Preparation (main methods).
7. Application (in industry, in engineering, in agriculture, in medicine and pharmacy, in everyday life).
8. Importance (for national economy, for a man).

Текстовые материалы к учебной конференции по теме 3.4. «Химический элемент (на выбор обучающегося)».

Iron

Iron is the second most abundant metal in nature after aluminium. But native iron is extremely rare. Probably, the first iron used by our forefathers was of a meteoritic origin.

Iron oxidizes readily in the presence of water and air and is found mainly in the form of oxides. Oxidation of iron is responsible for the fact that extant articles made of iron in antiquity are extremely rare. Man discovered iron about five thousand years ago. At first iron was very expensive and was valued much higher than gold; very often iron jewellery was set in gold.

Peoples of all continents became aware of gold, silver, and copper approximately at the same time; but in the case of iron the situation is different. Thus, in Egypt and Mesopotamia the process of extracting iron from ores was discovered two thousand years B.C.; in Trans-Caucasus, Asia Minor, and ancient Greece at the end of the second millenium; in India in the middle of the second millenium; and in China much later, only in the middle of the first millenium B.C. In the countries of the New World[4] Iron Age began only with the arrival of Europeans, i.e. in the second millenium A.D.; some African tribes began to use iron skipping the Bronze Age period in development. This is due to the difference in natural conditions. In countries where natural resources of copper and tin were small, a demand arose for replacing these metals. America had one of the largest deposits of native copper and, therefore, it was not necessary to search for new metals. Gradually, production of iron grew and iron began to pass from the category of precious metals into that of ordinary ones. By the beginning of the Christian era iron was already widely used.

Among all metals and alloys known by that time, iron was the hardest one. Therefore, as soon as iron grew relatively cheap, various tools and weapons were manufactured from it. At the beginning of the first millenium A.D. production of iron in Europe and Asia had made considerable progress; particularly great successes in smelting and processing iron had been achieved by Indian metallurgists. It is interesting to have a look at the development of iron production methods. At first man used only meteoritic iron, which was very rare and therefore expensive. Then people learnt how to produce iron by intensively heating its ores with coal on windy sites. Iron thus obtained was spongy, of low grade, and with large inclusions of slag. An important step in iron production was made with the invention of a furnace open at the top and lined with a refractory material inside. Excavations of ancient towns in Syria indicate that iron of a rather good quality was produced in this way. Later, people noted that cast iron, which had been considered to be a waste product, could be transformed into iron, the process requiring much less coal and yielding high-quality iron.

By the end of the 15th century first smelting furnaces appeared producing exclusively cast iron. Iron and steel smelting processes were rapidly improving. In 1855 there appeared the converter process of steel making which is still used. The Martin process developed in 1865 yields steel almost free of slags.

A chemical symbol Fe originates from the Latin *ferrum*, which means ―iron.

Sodium and Potassium

Man had known sodium and potassium compounds for a very long time. Carbonates of these metals were used in Egypt for laundry. Common salt, one of the most widespread sodium compounds, was used in foods from time immemorial; in some countries it was very expensive and sometimes wars were waged for the right to possess salt mines. Sodium carbonate was usually obtained from salt lakes whereas potassium carbonate by leaching plant ash; for this reason the former was named mineral alkali and the latter vegetable alkali. The word ―alkali‖ was introduced by Geber, a medieval alchemist, although he made no distinction between the two carbonates. The differences in their nature were first mentioned in 1683. The Dutch scientist I. Bon noted that when soda and potash were used in the similar process, the shapes of the precipitated crystals were different depending on the initial product.

In 1702 G. Stahl noted the difference in crystals of some sodium and potassium compounds. This was an important step in distinguishing between soda and potash. In 1736 the French chemist A. Monsean proved that soda was always present in common salt, Glauber's salt, and in borax. Since an acidic constituent of soda was known, the nature of the basic constituent was of great interest. According to Monsean, soda formed Glauber's salt with sulphuric acid, cubic saltpeter (sodium nitrate) with nitric acid, and a variety of sea salt with hydrochloric acid: isn't this reason enough to deduce that soda is the basis of sea salt?

Although chemists had suspected for a long time that alkali earths were oxides of metals, the nature of soda and potash had not been studied up to the early 19th century. Even Lavoisier had no definite idea on this subject. He did not know what the basic constituents of soda and potash were and assumed that nitrogen could be a constituent. This confusion seems to stem from the similarity between the properties of sodium, potassium, and ammonium salts.

Credit for determining these constituents belongs to H. Davy. At first he was dogged by failures: he could not separate metals from soda and potash with the aid of a galvanic battery. However, soon the scientist understood his error – he used saturated aqueous solutions but the presence of water hinders decomposition. In October, 1807, Davy decided to melt anhydrous potash, and as soon as he started electrolysis of the alkali hydroxide melt, small balls resembling mercury with bright metallic lustre appeared on the negative electrode immersed into the melt. Some of the balls burnt up immediately with an explosion forming bright flame while the others did not burn, but just dimmed and became covered with a white film. Davy concluded that numerous experiments had shown that the balls were the substance which he had been looking for and this substance was highly inflammable potassium hydroxide.

Davy studied this metal thoroughly and found that when it reacted with water the resulting flame was due to burning of the hydrogen liberated from water. Having studied the metal obtained from potassium hydroxide, H. Davy began to search for sodium hydroxide using the same method and he succeeded in separating another alkali metal. The scientist noted that for its preparation a much more powerful battery was required than in the experiments with potash. Nevertheless, the properties of both metals turned out to be similar. For a short time the scientist carefully studied the properties of potassium and sodium. Some chemists doubted the elemental nature of sodium and potassium believing that they were compounds of alkalis with hydrogen. However, Gay Lussac and Thenard proved convincingly[7]that Davy had, indeed, obtained simple substances.

Resembling Barium

When the Curies and G. Bemont analysed pitchblende[1] they noticed a higher radioactivity of one more fraction apart from the bismuth fraction. After they had succeeded in extracting polonium they started to analyse the second fraction thinking that they could find yet another unknown radioactive element. The new element was named radium from the Latin *radius* meaning ray. The birthday of radium was December 26, 1898 when the members of the Paris Academy of Sciences heard a report entitled ―On a new highly radioactive substance contained in pitchblende‖. The authors reported that they had managed to extract from the uranium ore tailings a substance containing a new element whose properties are very similar to those of barium. The amount of radium contained in barium chloride proved to be sufficient for recording its spectrum. This was done by the well-known French spectral analyst E. Demarcay who found a new line in the spectrum of the extracted substance. Thus, two methods – radiometry and spectroscopy – almost simultaneously substantiated the existence of a new radioactive element.

The position of radium among the natural radioactive elements (of course, excluding thorium and uranium) almost immediately proved to be the most favourable one owing to many reasons. The half-life of radium was soon found to be fairly long, namely, 1600 years. The content of radium in the uranium ores was much higher than that of polonium (4300 times higher); this contributed to natural accumulation of radium. Furthermore, the intensity of alpha radiation of radium was sufficiently high to allow an easy monitoring of its behaviour in various chemical procedures. Finally, a distinguishing feature of radium was that it evolved a radioactive gas. Radium was a convenient subject for studies owing to a favourable combination of its properties and therefore it became the first radioactive element (again, with the exception of uranium and thorium) to find its permanent place in the periodic system without long delay. Firstly, chemical and spectral studies of radium demonstrated that in all respects it belongs to the subgroup of alkaline earth metals; secondly, its relative atomic mass could be determined accurately enough. To do this sufficient amounts of a radium preparation had to be obtained. The Curies worked ceaselessly for 45 months in their ill-equipped laboratory processing uranium ore tailings from Bohemian mines. They performed fractional crystallization about 10000 times and finally obtained a priceless prize - 0.1g of radium chloride. The history of science knows no more noble example of enthusiastic work. This amount was sufficient for measurements and on March 28, 1902, Marie Curie reported that the relative atomic mass of radium was 225.9 (which does not differ much from the current figure of 226.02). This value just suited the suggested position of radium in the periodic system.

The discovery of radium was the best substantiated one among the many alleged discoveries of radioactive elements, which soon followed. Every year more new discoveries were reported. Radium was also the first radioactive element obtained in the metallic form.

Marie Curie and her collaborator A. Debierne electrolyzed a solution containing 0.106 g of radium chloride. Metallic radium deposited on the mercury cathode forming amalgam. The amalgam was put into an iron vessel and heated under a hydrogen flow to remove mercury. Then grains of silvery whitish metal glistened at the bottom of the vessel.

The discovery of radium was one of the major triumphs of science. The studies of radium contributed to fundamental changes in our knowledge of the properties and structure of matter and gave rise to the concept of atomic energy. Finally, radium was also the first radioactive element to be practically used (for instance, in medicine).

Radium

At the end of the 19th century uranium compounds were investigated and were found to emit penetrating rays. These rays were discovered to affect a protected photographic plate in much the same manner as X - rays. Besides, these rays were observed to cause the air through which they pass to become a conductor of electricity. The rays from uranium compounds were found to differ from X- rays, however, in that they were not produced by any artificial means. Instead, they appeared to be emitted by certain materials quite spontaneously. The production of these rays, therefore, proved to be a perfectly natural process. Further work showed that a uranium mineral called pitchblende was much more strongly radioactive than could be accounted for by its content of uranium alone. Pitchblende was therefore suspected of containing some undiscovered element of greater radioactive power than uranium itself.

The research of the unknown element was undertaken by a Polish woman, living in France, Mary Curie, who together with her husband, Pierre Curie, discovered the element she was searching for. The element was given the name radium and was stated by M. Curie to resemble barium in being precipitable as an insoluble sulphate. The atomic weight of the radium was found by M. Curie by the analysis of radium chloride to be approximately 225, and later she obtained the more accurate value, 226.2, by the analysis of a relatively large quantity (0.1 gr.) of pure radium bromide.

Radium is interesting particularly because it emits rays which are similar to those first discovered in the case of uranium. This property has been named radiactivity and the substances that emit penetrating radiations are said to be radioactive. The rays emitted possess energy as shown by their ability to affect the photographic plate, to cause zinc sulphide to emit light, and to render air a conductor of electricity. In addition, the emission of rays may be shown to be attended by a liberation of heat; one gram of radium has been estimated to evolve as much as 133 calories of heat per hour. The evolution of heat does not depend on whether the radium is present as a chloride, a bromide, or in metallic form. This seems evidence that the emission of heat is a property of the radium atom. Thus, radium atom may be seen to be a source of energy that is released, in part, during the radioactive disintegration.

Silicon

Silicon is the second most abundant element on Earth after oxygen. Although it constitutes 28 per cent of the earth's crust, its abundance did not make for its early discovery. The reason for this lies in the difficulty of reducing silicon from its oxide.

Generally speaking, there is every ground to classify silicon as an element of antiquity. Its compounds were known and used from time immemorial (suffice it to mention silicon tools of primitive man). We classified carbon as an element of antiquity since it was known in a free state from very remote times. However, that carbon is a chemical element became clear only two hundred years ago. Glass, in the long run, is also a silicon material. However, the date of silicon discovery is the date of its preparation in a free state since such is the established practice in the history of science.

At the turn of the 18th century many scientists believed that silica, or silica earth, contained an unknown chemical element and tried to isolate it in a free state. H. Davy attempted to decompose silica with an electric current – the method by which a number of alkali metals had already been prepared – but without success. The scientist's attempt to prepare free silicon by passing metallic potassium vapour over red-hot silicon oxide also failed. In 1811 L. J. Gay Lussac and L. Thenard applied themselves to the problem. They observed a vigorous reaction between silicon tetra-fluoride and metallic potassium; a reddish brown compound was formed in the reaction. The scientists could not reveal the nature of the product; most likely, it was contaminated amorphous silicon.

At last, in 1823, J. Berzelius had a stroke of good luck. The Swedish chemist heated a ground mixture of silicon oxide, iron, and charcoal to a high temperature and obtained an alloy of silicon and iron (ferrosilicium), the composition of which he was able to prove. To separate free silicon, J. Berzelius

repeated L. Thenard and L.J. Gay Lussac's experiments and also obtained a brown mass. Under the action of water, hydrogen was liberated and free amorphous silicon was formed as a dark brown insoluble powder which contained potassium silicofluoride as an impurity. Berzelius removed the impurity by washing the precipitate for a very long time.

Another method proposed by J. Berzelius – calcination of potassium fluorosilicate with an excess of potassium – proved to be more successful and straightforward. The sintered mass was decomposed with water and, as a result, pure amorphous silicon was obtained. J. Berzelius showed that upon calcination silicon was transformed into silica; this makes Berzelius the discoverer of silicon. Crystalline silicon was obtained in 1854 by A. Saint Claire Deville during separation of metallic aluminium. The Latin name ―silicium‖ originates from *silex* meaniing ―a hard stone‖.

3. Рекомендации по выполнению тестовых заданий

Тестовые задания предусматривают закрепление теоретических знаний, полученных студентом во время занятий по данной дисциплине. Их назначение – углубить, систематизировать и проверить знания студентов по отдельным темам, а также языковые и речевые навыки и умения.

Перед выполнением тестовых заданий необходимо повторить разделы учебного материала, рекомендованные преподавателем. При подготовке следует также обращаться к грамматическим пособиям и собственным конспектам обучающегося.

В тестах предусмотрены задания различных типов: закрытые тесты, в которых нужно выбрать один верный вариант ответа из представленных; задания на сопоставление; открытые тесты, где предстоит самостоятельно заполнить пропуски или ответить на поставленный вопрос.

Пример задания закрытого типа по теме 2.1 Оборудование и описание химической лаборатории.

Chemists _____ (make) experiments with different substances.

a) is made b) are made

c) were made d) have made

Правильный ответ: d) have made

Пример задания открытого типа по теме 2.1 Оборудование и описание химической лаборатории.

What are the three rooms a typical laboratory of the academy consists of?

Правильный ответ: a room for storing the necessary substances, a room for recording the obtained findings and a room for washing laboratory vessels

4. Рекомендации по выполнению контрольной работы

Цель контрольной работы – углубить, систематизировать и проверить знания студентов по отдельным темам, а также языковые и речевые навыки и умения.

После обсуждения грамматического и нового лексического материала на практических занятиях обучающиеся выполняют задания самостоятельно, тем самым закрепляя изученный материал. Студенту следует тщательно готовиться к выполнению контрольной работы. Положительный результат будет получен, если он систематически посещает занятия по дисциплине, активно участвует в работе на них, самостоятельно работает по программе курса.

Задания контрольной работы сгруппированы по темам:

1. Обучение в фармацевтической академии
2. Описание проведения экспериментов в химической лаборатории
3. Великие учёные и их открытия
4. Химический элемент

Типовые задания из контрольной работы по теме «Химический элемент»

Задание 1. Составьте предложения из слов, учитывая порядок слов в английском утвердительном предложении.

1. made / oxygen / is / atoms / of / an / molecule / two

Правильный ответ: An oxygen molecule is made of two atoms

2. sticks / the / together / forms / and / slowly / dust / planets / the
3. see / bench / any / on / cannot / flasks/ we / the
4. systems / all / same / living / characteristics / the / have
5. theory/ not / some / agree / cosmologists / with / do / this
6. work / organism / the / together / many / systems / human / includes / open / that
7. computer / goes / afternoon / to / lab / Tuesday / seldom / the / on / she

Задание 2. Поставьте предложения в отрицательную форму.

1. The chemist is determining the constituents of water.

Правильный ответ: The chemist isn't determining the constituents of water

2. I am heating hydrogen in the tube
3. They are studying chemistry now
4. The analyst is still working in the laboratory
5. They were making experiments from 5 to 8 o'clock in the lab yesterday.
6. They will be studying these elements all day long tomorrow.
7. When I entered the laboratory the students were finishing their work.

5. Рекомендации по подготовке к собеседованию.

Собеседование можно отнести к многоплановой форме контроля, в ходе которой осуществляется проверка сформированности не только коммуникативной, но и лингвокультурологической компетенции. В ходе собеседования проверяется умение обучающегося создавать монологические высказывания на разные темы с соблюдением языковых норм (орфоэпических, лексических, грамматических, стилистических), а также принимать участие в диалоге. Обучающиеся должны владеть коммуникативно-речевой стратегией, помогающей не теряться в ситуации непосредственного общения, и создавать ситуативно уместные, достаточно спонтанные речевые устные высказывания, которые требуются по условиям определенного учебного задания.

В практической деятельности по подготовке обучающихся к собеседованию необходимо обратить особое внимание на обучение пересказу текстов по изучаемым темам. В процессе «говорения» обучающийся должен показать степень владения всеми коммуникативно-речевыми формами речи (повествование, описание, рассуждение), а также монологического высказывания и диалогического общения. Необходимо обращать внимание обучающихся на то, что некоторые задания опираются на их личный жизненный и учебный опыт и результат собеседования зависит также от него.

Рекомендуемая последовательность подготовки к монологическому высказыванию:

• прочитать текст и сделать необходимые пометы, например, проставить ударение в словах, объяснить значение слов;

• выделить ключевые слова и слова, вызывающие трудности при прочтении;

• сформулировать основную мысль каждого абзаца и всего текста;

• выделить главную и второстепенную информацию каждого смыслового фрагмента;

• составить план пересказа;

• пересказать текст.

По окончании монологического высказывания обучающемуся задаётся несколько вопросов по теме. Вопросы подобраны таким образом, что помогают расширить и разнообразить содержательный и языковой аспект речи обучающегося, стимулировать его к использованию новых форм речи и расширению активного словарного запаса. Это обеспечивает естественный переход от монолога к диалогу с собеседником. Цель экзаменатора-собеседника – эмоционально расположить экзаменуемого к беседе, стимулировать его речевую деятельность. Диалог оценивается в целом по всем ответам обучающегося на вопросы; учитывается речевая ситуация.

Тексты для собеседования по темам раздела 1. Обучение в фармацевтической академии.

Text 1

I should say it is not easy to be a student of the Perm Academy of Pharmacy. We have classes 6 days a week. My working day begins at 7 o'clock in the morning. You know, I'm not an early riser but my alarm-clock rings and there is nothing to be done as to get up and start my new working day.

Usually I do my physical jerks, go to the bathroom, wash myself, clean my teeth and brush myself. It takes me 10 minutes to do my bed and dress myself. Then I go to the kitchen to have my breakfast. It may be a cup of tea or coffee and some sandwiches.

After my morning meal I leave for the Academy at 8.30 or at 9 o'clock in the morning. We have three or four pairs a day. There is a 30-minutes break before the last pair. Our classes are usually over at 3 o'clock in the afternoon. But sometimes I do not leave the Academy after classes because of my out-of-class activities. So I have dinner either at home or at the canteen. When at home I usually have something substantial for dinner, for example, cabbage soup for the first course, hot meat or fish with some vegetables for the second one and a glass of juice for dessert.

As a rule 1 have no spare time on my week-days. I usually spend much time to do my homework. Sometimes I have to go to the library either to get ready for my practical classes or to write a report. Sometimes I have to sit up either to write a composition or to translate a text from English into Russian.

As you remember, eight o'clock is supper time in our family. We all get together in the kitchen to have our evening meal and to discuss different problems.

After that I prefer to do a little reading. Sometimes I either watch TV or listen to the music. And every evening I do my best to find time for my computer.

It is until midnight that I usually go to bed. So by the end of the week I get tired and need a good rest. Sunday is the only day I can get up later and stay at home the whole day. It’s my best day in a week.

Text 2

The pharmaceutical education in the Urals is connected with the foundation of Perm State University. The experience of WWI showed that there was practically no pharmaceutical industry in the country and it needed the specialists in pharmacy a lot. So, on the initiative of Nikolay Ivanovich Kromer, the famous Russian scientist, the Master of Pharmacy, the pharmaceutical department at Perm State University was founded in 1918. It gave a birth to the high pharmaceutical education in the Urals. Later the pharmaceutical department got the status of the pharmaceutical faculty. In 1937 it became an independent Pharmaceutical Institute. In 1955 the extra-mural department was established. In 1992 the Institute started educating foreign students from different countries of Africa, Asia and the East. One more page in the history of the Institute is the fact that it was reorganized into Academy in 1995.

About 4000 students both Russian and foreign study at the Academy. Some of them attend the day department and others study by correspondence at the extra-mural department. Moreover, there are more than 200 interns and 50 postgraduate students at the academy. For those who are going to enter the Academy the preparatory courses are organized.

The course of training the day department students runs for 5 and of the extra-mural department students for 5.5 years. During this period the students study general and special subjects. General subjects are English, Maths, History, Physical Education, etc. Special ones are different branches of Chemistry, Botany, Pharmacology, Pharmacognosy, etc. Besides, the students have practice in the fields, at the chemist's shops and pharmaceutical factories. Moreover, the students can take part in different students' conferences and contests, and play sports in sport clubs. Those students who study well and take part in social work get grants. On graduating from the Academy the students get the profession of a pharmacist and can work or continue their education at postgraduate courses, which takes for 3 more years. The graduates of the academy can work at chemist's shops, pharmaceutical factories, firms, companies and at pharmaceutical academies.

Text 3

Perm Pharmaceutical Academy occupies three buildings, a scientific research centre "Pharmatest", 2 hostels and a botanic garden. The main or the administrative building is in 2, Polevaya street. It is a modern four-storied building. There are rector's and dean's offices, an account department, a personnel department and 2 chairs: the chair of pharmacognosy with the course of botany and the chair of management and economy of pharmacy. Besides, there are many classrooms, a large lecture hall and a canteen. Moreover, there is a museum of pharmacy and history of the Academy.

The laboratory building in 46, Krupskaya street was built many years ago. It is a typical laboratory building. There are 10 chairs in it: the chair of general and organic chemistry, the chair of pharmaceutical chemistry at the day department, the chair of pharmaceutical chemistry at the advanced training faculty for pharmacists and at the extra-mural department, the chair of biological chemistry, the chair of analytical chemistry, the chair of physical education, the chair of pharmaceutical technology, the chair of physiology, the chair of pharmacology and the chair of industrial technology of medicines with a course of biotechnology. On the ground floor of the building there is a library and a reading room where the students can prepare for their seminars and practical work, a large gym where the students can play sports and a canteen. Two large lecture halls, many classrooms and laboratories supplied with necessary equipment are also housed in this building. Experienced teachers from different chairs conduct classes and seminars in those classrooms and laboratories.

Next to the laboratory building you can see a scientific research centre "Pharmatest" with the chair of toxicological chemistry.

The theoretical building, situated in 81, Gagarin Avenue, is a five-storied one. There are seven chairs in the theoretical building. They are: the chair of organization, economy and history of pharmacy, the chair of microbiology, the chair of humanities and social and economic disciplines, the chair of extreme medicine and medical goods, the chair of foreign languages, the chair of physics and mathematics and the chair of Latin and pharmaceutical terminology. Besides, there are many classrooms, a dental clinic and a café in this building.

Most students of our academy live in its two hostels and only some rent rooms. Hostel №1 in 72a, Gagarin Avenue is a modern, 9-storied building with central heating, hot and cold water, shower cabins, baths, a refuse chute, an elevator, electric cookers and sinks in the kitchens. Moreover, there is a reading hall, a student's club and a canteen.

Hostel № 2 in 101, Ekaterininskaya street is an old 5-storied building with a lot of rooms for students to live in. Besides, there is a health centre, a library, an Internet and other clubs.

Text 4

Perm Pharmaceutical Academy has more than 200 professors and teachers at 20 chairs which carry out academic, scientific and research work at its three buildings, a scientific research centre "Pharmatest" and a botanical garden. Lectures are given in the lecture halls, practical classes are held in the classrooms and laboratory classes – in the scientific laboratories.

The Academy has a botanical garden where the students have practice cultivating, collecting and studying different medicinal herbs.

Besides, the students of our Academy take part in scientific work making experiments in its many labs and a scientific research centre "Pharmatest". They attend 20 Students' scientific societies of the Academy. The results and achievements of scientific and research work are written down in scientific articles and reported at scientific students' and teachers' conferences.

There are also many extra-curricular activities at Perm Pharmaceutical Academy. They are the sports' club, the students' club and the students' trade-union organization.

The students who like sports can attend the sports' club and play volleyball, basketball, football or do aerobics, athletics and powerlifting. They take part in different matches and competitions.

The students' club organizes different cultural events: contests, concerts, shows and festivals. The students who attend it sing, dance and do dramatizations.

The students' trade-union organization protects social and economic rights and interests of the academy students.

Text 5

Nikolay Ivanovich Kromer (real name – Johann Napoleon Kromer) is a Russian and Soviet pharmacist, chemist, the founder of pharmaceutical education in the Urals and Siberia was born on the 31of October in 1866 in Mitava Kurland province in the family of an apprentice typographer.

After finishing school and then the Derpt University he worked there as the laboratory assistant. In 1891 he went abroad on a year scientific commission to England. He carried out extensive research and scientific work, became a Master of Pharmacy and delivered lectures on analytical and organic chemistries. He worked in Petersburg, Kazan, Voronezh and Moscow as a leading toxicologist.

In 1917 he was sent to the Perm State University as the professor of the chair of pharmacy and pharmacognozy. In April 1918 on the initiative of N.I. Kromer the pharmaceutical department was opened. The first of August is considered to be the date of the beginning of the pharmaceutical education in the Urals.

The main academic subjects were pharmaceutical chemistry, pharmacognozy, technology of making medicines and there were additional courses such as pharmaceutical law, forensic chemistry, and chemistry of food products. Thanks to Kromer's energy and persistence the chairs and laboratories were supplied with German equipment and were the best in the country. A garden of medicinal plants was laid at that time. In 1920 a model pharmacy was established on the basis of this pharmaceutical department.

Knowing the requirements of the practical pharmacy in the Urals and Siberia N.I. Kromer organized the advanced training courses for pharmacists and took an active part in the establishing of the first pharmaceutical school.

He published 118 scientific works among them 18 in co-authorship with students. For some time he worked at the Medical Institute at the chemical and pharmaceutical department. While organizing an independent Perm Pharmaceutical Institute in 1937 he was the chairman of the Committee making up an academic programme and worked much as the head of the chair of inorganic and analytical chemistries and the chair of pharmaceutical and forensic chemistries.

The name of the outstanding scientist and chemist, a Master of Pharmacy, Doctor of Chemical sciences, Professor N.I. Kromer is known to all the pharmaceutical publicity.

N.I. Kromer died in August 1941and was buried in Egoshihinsky cemetery in Perm.

Тексты для собеседования по темам раздела 4. Химический элемент: химия и периодическая система Д. И. Менделеева..

Text 1

Chemistry is the science which deals with materials, their properties and the transformations they undergo. So, chemistry is the study of the composition and properties of matter, both physical and chemical changes, the conditions un-der which such changes take place, and the energy changes that accompany them. Chemistry is concerned with different natural phenomena.

Every substance has physical and chemical properties. Physical properties include colour, odour, solubility, density, hardness, boiling and melting points. Chemical properties include reactions with other materials.

Matter exists in three states: the solid, the liquid and the gaseous states. A substance can be transformed from one state into another under the changes of its temperature.

Chemical products are widely used in everyday life. Metals, glass, plastics, dyes, drugs, paper, soap, explosives and perfumes are all made of chemicals. All this is used in national economy.

Chemistry has two main aspects: descriptive chemistry (the discovery of chemical facts) and theoretical chemistry (the formulation of theories).

The broad field of chemistry may also be divided in other ways. An important division of chemistry is that into the branches of organic chemistry and inorganic chemistry.

Organic chemistry is the chemistry of the compounds of carbon that occur in plants and animals.

Inorganic chemistry is the chemistry of the compounds of elements other than carbon. Each of these branches of chemistry is in part descriptive and in part theoretical.

Everyone understands the importance of chemistry. The future of chemistry is practically unlimited. Rapid development of chemical industry will make it possible to create many new goods: machines; plastics, polymers, it will help to understand many new phenomena.

Text 2

Dmitry Ivanovitch Mendeleyev, the great Russian scientist, the father of the Periodic Law and of the Periodic Table of Elements, was born in Tobolsk in 1834 in the family of the director of the town Gymnasium.

He received a secondary education at the Tobolsk Gymnasium. He studied very hard, he especially liked mathematics, physics and history. At the age of 16 he finished gymnasium and went to Petersburg where he entered the physico-mathematical department of Pedagogical Institute and graduated from it with a gold medal in 1855.

After graduation Mendeleyev worked as a teacher of chemistry for two years, first at the Simferopol and then Odessa Gymnasiums. In 1859 Mendeleyev received his Master's degree and went abroad on a two-year scientific commis-sion. In 1860 he took part in the World Chemical Congress in Karlsruhe.

When Mendeleyev returned to Russia he was elected the professor of the Petersburg Technological Institute. In 1865 Mendeleyev was granted the Doctor of Science degree for the thesis on the combination of alcohol with water. This work was both of great theoretical and practical significance.

Soon after that D.I. Mendeleyev was appointed the Professor of St. Petersburg University where he carried out his scientific and pedagogical ac-tivities for twenty-three years, teaching chemistry. His lectures were always inter-esting and the students of that time listened to them with great interest and atten-tion. Besides lectures Mendeleyev made a lot of experiments in his laboratory. He wrote down the results of his experiments and later grouped all those data.

Mendeleyev described more than 60 elements, which were known at that time and found that all the elements could be divided into nine groups. Each of these groups may be divided into five series. The elements of one group possess more or less similar properties. In 1869 Mendeleyev published his Periodic Table of Elements which began a new era in chemical thought.

Mendeleyev also paid much attention to many subjects. He was the first to put forward the idea of studying the upper layers of the atmosphere. His numer-ous works dealt with many subjects: properties of liquids, theory of solutions, the development of the gas law, the use of oil and many others.

In 1893 Mendeleyev was appointed the Director of the Bureau of Weights and Measures. He was elected the member of many academies abroad. D. I. Men-deleyev continued his research work to the very last day of his life. In February 1907 at the age of 73 Mendeleyev died of pneumonia.

Mendeleyev always combined theory and practice. He gave a great deal of attention throughout his life to the development of the industry of his country. He wrote: “Science and industry – there lie my dreams!”. The world is thankful to Mendeleyev for his great contribution to the world science.

Text 3

Oxygen is a constituent part of water. The chemical symbol of oxygen is O. Its atomic weight is 16. The oxygen molecule O_2 is diatomic. Oxygen is a colourless, odourless and tasteless gas. It is a little heavier than air. Oxygen is sparingly soluble in water; at 20°C 100 ml of water will dissolve only 3 ml of oxygen. This makes it possible to collect it over water and to store it in gas holders.

Oxygen is a very active element. It combines with almost all other elements, often liberating heat and light. Reactions of combination with oxygen are called oxidation. Compounds of elements with oxygen are called oxides. Oxygen is the most abundant element in nature. It is found in nature both free in air and in the combined state in water, etc.

Oxygen is of very great importance in nature, as it is a constituent part of the tissues of all plants and animals. Most organisms derive the energy needed for their vital activities from the oxidation of various substances by oxygen. Atmospheric oxygen is indispensable for respiration.

Oxygen is produced in large quantities for technical purposes from liquid air. When liquid air evaporates, nitrogen which has a lower boiling point volatilizes more rapidly, leaving liquid oxygen with a small amount of nitrogen behind. Oxygen is used in metallurgy and other industries. It is used to produce high temperatures by burning various gases. Oxygen is also used in medicine. It is stored and transported in blue steel cylinders under a pressure of 150 atm.

The other constituent of water is hydrogen. The chemical symbol of hydrogen is H. Its atomic weight is 1.008. The hydrogen molecule H_2 is diatomic. Hydrogen is a colourless, odourless and tasteless gas. It is the lightest of all gases; it is 14.4 times lighter than air. It is sparingly soluble in water, but it dissolves readily in certain metals.

It is difficult to liquefy hydrogen. Liquid hydrogen is a colourless light liquid boiling at – 235°C, when evaporating it solidifies into clear crystals with a melting point of – 259.4°C. At ordinary temperatures, hydrogen does not react with any of the elements except fluorine. With increasing temperature, the bond between the atoms in the hydrogen molecule weakens and it begins to react with many simple and complex substances.

Hydrogen is an abundant element in nature as well. It constitutes about 1 per cent by weight of the Earth, including terrestrial waters and atmosphere. Hydrogen occurs in nature both free and in the combined state. It is evolved in the free state in small amounts together with other gases during volcanic eruption and from wells1 during oil production. Hydrogen is more abundant in combination with other gases. It is constituent of water, rocks, petroleum, coal, natural gases, etc.

Hydrogen finds wide application in engineering; liquid hydrogen is used to produce low temperatures. It is also used in mixture with helium. In food industry, hydrogen is used to convert liquid vegetable oils into solid fats. It serves as reducing agent2 in the production of some rare metals. When hydrogen burns in pure oxygen the temperature rises up to 2500°C. The largest amount of hydrogen is used by the chemical industry for ammonia synthesis.

6. Рекомендации по переводу литературы

При переводе научной литературы рекомендуется следующая последовательность работы над текстом:

1. Прочесть весь текст или абзац и постараться уяснить его общее содержание.

2. Каждое сложное предложение разбить на отдельные предложения: сложноподчиненные на главное и придаточное, а сложносочиненные – на простые.

3. При анализе сложных по своей структуре предложений, в которых не сразу можно определить составляющие их элементы, рекомендуется, прежде всего, найти сказуемое главного и придаточных предложений.

4. В каждом предложении определить группу сказуемого (по личной форме глагола), затем найти группу подлежащего и группу дополнения.

5. Перевод предложения начинать с группы подлежащего, затем переводить группу сказуемого, дополнения и обстоятельства.

6. Отыскать незнакомые слова в словаре, уяснив предварительно, какой частью речи они являются в данном предложении. При этом не брать первое значение слова, а прочесть все значения, дающиеся для данной части речи, и выбрать наиболее подходящее по содержанию переводимого текста. Выписать незнакомые слова в терминологический словарь, указать перевод на русский язык.

Тексты для перевода по теме 4.3 «Химический элемент».

Chlorine

Chlorine was first produced in 1774 by Carl Wilhelm Scheele in Sweden. Scheele collected the gas released by the reaction of pyrolusite (manganese dioxide) with spiritus salis – an alchemical term meaning spirit/breath of salt. The new gas had, according to Scheele, “a very perceptible suffocating smell, which was most oppressive to the lungs… and gives the water a slightly acidic taste… the air in it acquires a yellow color…”

Scheele also noted the high reactivity and the bleaching qualities of the new gas he had made: “…all metals were attacked… fixed alkali was converted into common salt… all vegetable flowers – red, blue, and yellow – became white in a short time; the same thing also happened with green plants… insects immediately died.

Despite the accuracy of his observations, Scheele mistakenly thought the new gas was a dephlostiganated form of muriatic acid.

The famous French chemist Antoine Lavoisier believed the new gas should be called oxymuriatic acid (an oxide of hydrochloric acid) based on the as yet undiscovered element murium.

The confusion about chlorine’s true identity was caused by the phlogiston theory; phlogiston had been accepted by chemists for most of the 1700s – until Lavoisier himself debunked it. Phlogiston was a ‘substance’ used to explain the then inexplicable. Conveniently, it had negative weight when it needed to, and ‘explained’ reactions such as rusting and burning.

Lavoisier was the architect of phlogiston’s downfall, showing that the chemistry of oxygen was a better explanation in chemical reactions than phlogiston was.

By 1810 the scientific consensus was that the element we now call chlorine was actually a compound that contained oxygen. English chemist Sir Humphry Davy found that the consensus was wrong; he could not get the new yellow-green gas to react with a charcoal electrode, which made him believe it may not contain oxygen. In reactions with phosphorus and ammonia, he demonstrated the new gas did not contain oxygen. He used a huge, 2000 plate voltaic pile (battery) to see whether he could extract oxygen from the gas’s phosphorusand sulfur compounds, but again he found no oxygen.

In 1811, Davy concluded the new gas was in fact a new element. He named it chlorine, from the Greek word ‘chloros,’ meaning pale green or yellow-green.

Hydrogen

A favorite school chemistry experiment is to add a metal such as magnesium to an acid. The metal reacts with the acid, forming a salt and releases hydrogen from the acid. The hydrogen gas bubbles up from the liquid and students collect it in small quantities for further experiments, such as the 'pop-test.'

The first recorded instance of hydrogen made by human action was in the first half of the 1500s, by a similar method to that used in schools now. Theophrastus Paracelsus, a physician, dissolved iron in sulfuric acid and observed the release of a gas. He is reported to have said of the experiment, "Air arises and breaks forth like a wind." He did not, however, discover any of hydrogen's properties.

Turquet De Mayerne repeated Paracelsus's experiment in 1650 and found that the gas was flammable. Neither Paracelsus nor De Mayerne proposed that hydrogen could be a new element. Indeed, Paracelsus believed there were only three elements – the tria prima – salt, sulfur, and mercury – and that all other substances were made of different combinations of these three.

In 1670, English scientist Robert Boyle added iron to sulfuric acid. He showed the resulting (hydrogen) gas only burned if air was present and that a fraction of the air (we would now call it oxygen) was consumed by the burning.

Hydrogen was first recognized as a distinct element in 1766 by English scientist Henry Cavendish, when he prepared it by reacting hydrochloric acid with zinc. He described hydrogen as "inflammable air from metals" and established that it was the same material (by its reactions and its density) regardless of which metal and which acid he used to produce it. Cavendish also observed that when the substance was burned, it produced water.

French scientist Antoine Lavoisier later named the element hydrogen (1783). The name comes from the Greek 'hydro' meaning water and 'genes' meaning forming – hydrogen is one of the two water forming elements.

In 1806, with hydrogen well-established as an element, English chemist Humphry Davy pushed a strong electric current through purified water.

He found hydrogen and oxygen were formed. The experiment demonstrated that electricity could pull substances apart into their constituent elements. Davy realized that substances were bound together by an electrical phenomenon; he had discovered the true nature of chemical bonding.

Silicon

Silicon does not occur free in nature. Compounds of silicon make up about 27.6 per cent of the matter in the crust of the earth, and the element ranks next after oxygen in abundance.

It follows carbon in Column IVB of the Periodic Table and its chemistry like that of carbon is complex. Silicon plays an important part in the inorganic world. The importance of carbon in organic chemistry results from its possessing the ability to form carbon-carbon bonds, which permits complex molecules, with the most varied properties to exist. The importance of silicon in inorganic world results from a different property of the element. Silicon molecules exist in chains and more complex structure, in which the silicon atoms are characterized by being connected by oxygen atoms.

The important compounds of silicon and carbon are not at all similar. These differences are due to the silicon atom having a much larger radius than the carbon atom. The attraction of the nucleus for electrons is less in the silicon atom than in the carbon atom.

Although the compounds of silicon have been used for many centuries the element was not prepared until after the beginning of the 19^{th} century. Many methods are now in use for preparing silicon. One of them is to heat silicon dioxide with magnesium:

$SiO_2 + 2Mg = Si + 2MgO$

One way of preparing silicon industrially is by reducing the dioxide (SiO_2) with carbon in an electric furnace. Some difficulty is encountered in preventing silicon and carbon from reacting to form a carbide, but a product containing up to 98 per cent of silicon is made by this reaction.

Silicon resembles carbon in having crystalline as well as amorphous form. The latter is a brown powder that really consists of very small crystals. Crystalline silicon has a structure resembling that of diamond. They are alike in being very hard. Crystalline silicon is hard enough to scratch glass. Crystalline silicon is less active in chemical reactions than amorphous form.

Besides being employed in the steel industry free silicon has few uses. But the compounds of silicon have a wide application.

Oxygen

Oxygen was discovered in 1774 by Joseph Priestley in England and two years earlier, but unpublished, by Carl W. Scheele in Sweden. Scheele heated several compounds including potassium nitrate, manganese oxide, and mercury oxide and found they released a gas which enhanced combustion.

Priestley heated mercury oxide, focusing sunlight using a 12-inch 'burning lens' – a very large magnifying glass – to bring the oxide to a high temperature. Priestley's lens was smaller than the enormous one used by Antoine Lavoisier in his investigation of carbon.

Totally unexpectedly, the hot mercury oxide yielded a gas that made a candle burn five times faster than normal. Priestley wrote: "But what surprised me more than I can well express was that a candle burned in this air with a remarkably vigorous flame. I was utterly at a loss how to account for it."

In addition to noticing the effect of oxygen on combustion, Priestley later noted the new gas's biological role. He placed a mouse in a jar of oxygen, expecting it would survive for 15 minutes maximum before it suffocated. Instead, the mouse survived for a whole hour and was none the worse for it.

Antoine Lavoisier carried out similar experiments to Priestley's and added to our knowledge enormously by discovering that air contains about 20 percent oxygen and that when any substance burns, it actually combines chemically with oxygen.

Lavoisier also found that the weight of the gas released by heating mercury oxide was identical to the weight lost by the mercury oxide, and that when other elements react with oxygen their weight gain is identical to the weight lost from the air.

This enabled Lavoisier to state a new fundamental law: the law of the conservation of matter; "matter is conserved in chemical reactions" or, alternatively, "the total mass of a chemical reaction's products is identical to the total mass of the starting materials." In addition to these achievements, it was Lavoisier who first gave the element its name oxygen.

The word oxygen is derived from the Greek words 'oxys' meaning acid and 'genes' meaning forming. Before it was discovered and isolated, a number of scientists had recognized the existence of a substance with the properties of oxygen. In the early 1500s Leonardo da Vinci observed that a fraction of air is consumed in respiration and combustion.

In 1665 Robert Hooke noted that air contains a substance which is present in potassium nitrate (potassium nitrate releases oxygen when heated) and a larger quantity of an unreactive substance (which we call nitrogen).

In 1668 John Mayow wrote that air contains the gas oxygen (he called it nitroarial spirit), which is consumed in respiration and burning. Mayow observed that: substances do not burn in air from which oxygen is absent; oxygen is present in the acid part of potassium nitrate; animals absorb oxygen into their blood when they breathe; air breathed out by animals has less oxygen in it than fresh air.

Iron

Iron is the second most abundant metal in nature after aluminium. But native iron is extremely rare. Probably, the first iron used by our forefathers1 was of a meteoritic origin.

Iron oxidizes readily in the presence of water and air and is found mainly in the form of oxides. Oxidation of iron is responsible for the fact that extant2 articles made of iron in antiquity are extremely rare. Man discovered iron about five thousand years ago. At first iron was very expensive and was valued much higher than gold; very often iron jewelry was set in gold3.

People of all continents became aware of gold, silver, and copper approximately at the same time; but in the case of iron the situation is different. Thus, in Egypt and Mesopotamia the process of extracting iron from ores was discovered two thousand years B.C.; in Trans-Caucasus, Asia Minor, and ancient Greece at the end of the second millenium; in India in the middle of the second millenium; and in China much later, only in the middle of the first millenium B.C. In the countries of the New World4 Iron Age5 began only with the arrival of Europeans, i.e. in the second millenium A.D.6; some African tribes7 began to use iron skipping the Bronze Age8 period in development. This is due to the difference in natural conditions. In countries where natural resources of copper and tin were small, a demand arose for replacing these metals. America had one of the largest deposits of native copper and, therefore, it was not necessary to search for new metals. Gradually, production of iron grew and iron began to pass from the category of precious metals into that of ordinary ones. By the beginning of the Christian era iron was already widely used.

Among all metals and alloys known by that time, iron was the hardest one. Therefore, as soon as iron grew relatively cheap, various tools and weapons were manufactured from it. At the beginning of the first millenium A.D. production of iron in Europe and Asia had made considerable progress; particularly great successes in smelting9 and processing iron had been achieved by Indian metallurgists. It is interesting to have a look at the development of iron production methods. At first man used only meteoritic iron, which was very rare and therefore expensive. Then people learnt how to produce iron by intensively heating its ores with coal on windy sites. Iron thus obtained was spongy10, of low grade, and with large inclusions of slag11. An important step in iron production was made with the invention of a furnace open at the top and lined with a refractory material inside. Excavations of ancient towns in Syria indicate that iron of a rather good quality was produced in this way. Later, people noted that cast iron12, which had been considered to be a waste product, could be transformed into iron, the process requiring much less coal and yielding high-quality iron.

By the end of the 15th century first smelting furnaces13 appeared producing exclusively cast iron. Iron and steel smelting processes were rapidly improving. In 1855 there appeared the converter process of steel making which is still used. The Martin process developed in 1865 yields steel almost free of slags.

A chemical symbol Fe originates from the Latin ferrum, which means “iron”.

Тексты для перевода по теме 5.2 «Химическая промышленность в России».

Biomed

If to speak about “Biomed”, its history began in 1898 with establishing a small bacteriological laboratory which produced vaccines against hydrophobia.

In 1912 this bacteriological laboratory became bacteriological Institute and it organized vaccination against cholera and typhus. In 1933 on its basis the Perm bacteriological institute of epidemiology and microbiology was established. Later on it was reorganized into “Scientific Research Institute of Vaccines and Serums”.

In 1988 it got the status of the Scientific Industrial Association. Since then “Biomed” has been producing medicinal immunobiological preparations from blood of animals, different serums, antitoxins, preparations for treatment of disbacteriosis, bacteriophages, diagnostics, novocain, vitamin PP, Corvalol and others. Nowadays “Biomed” is a leading producer of a wide range of medical, immunobiological and pharmaceutical preparations in our country.

“Biomed” supplies and distributes medicines to different towns of Russia and abroad. The nomenclature of medicines is about 70 names.

Permpharmacy is the greatest pharmaceutical enterprise in the West Urals in making and distribution of medicinal preparations. “Permpharmacy” has been working at the pharmaceutical market for 60 years. The bases for the establishing of “Permpharmacy” were: the pharmaceutical chemist’s store which was established in 1939 and the laboratory of halenic preparations. They supplied our army with iodine, methylene blue, individual dressing packets. Nowadays “Permpharmacy” takes the leading place among Russian enterprises in the production of medicinal preparations. It produces more than 100 drugs from natural raw materials. The technology is based on century old experience of people’s medicine. The main directions of its work are: whole sale and retail trade of medicinal preparations of Russian and foreign make, production of medicines from natural ecologically clean raw materials, organization of networks of pharmacies.

Medisorb

JSC "Medisorb" is a leading Russian pharmaceutical company founded in 1993 in Perm. The company specializes in the production of generics - high-quality analogs of well-known drugs that remain affordable. Medisorb's portfolio includes over 40 drug names, about half of which are included in Russia's state register of vital and essential medicines.

The company's production facilities are equipped with modern technology compliant with international GMP quality standards. Medisorb operates three workshops running 24/7 and has quality control and research laboratories. The staff exceeds 400 employees, including specialists with advanced scientific degrees.

The company is actively developing, expanding its product range, improving technologies, and scaling production. Key areas include medications for cardiovascular diseases, diabetes, neurological disorders, as well as analgesics and sorbents.

JSC "Medisorb" holds leading positions in the Russian pharmaceutical industry, with special attention to the safety and efficacy of its products, confirmed by rigorous clinical trials and production control.

AVVA RUS

AVVA Rus is a modern pharmaceutical enterprise located in Kirov that specializes in the production of high-quality medicinal products. The company manufactures a wide range of pharmaceuticals, including over-the-counter medicines, formulations for both adults and children, and products designed for prevention and health support. The production process follows GMP standards, ensuring a high level of quality, safety, and product stability.

The company employs a multi-stage quality control system: laboratories test raw materials, intermediate stages, and finished dosage forms. Particular attention is paid to sterility, compliance with pharmacopoeial standards, accuracy of dosages, stability of active ingredients, and adherence to technological requirements. Thanks to this, AVVA Rus holds a strong position in the Russian pharmaceutical market and supplies reliable, competitive products.

The role of a chemical technologist is to conduct analytical or lab-based tests on a variety of chemicals, materials or products. They typically receive samples and conduct testing for the purposes of quality assurance, safety inspection, regulatory adherence, environmental impact or sample testing.This profession is an ideal career path for those who enjoy scientific study and prefer to work with their hands in a laboratory environment. Furthermore, depending on their employer, many chemical technologists are able to provide vital information through their testing and make a significant impact on people's lives.

Chemical Technician/Technologist

Chemical technologists are involved in quality control testing, environmental analysis, product R&D and more. They could work in a variety of settings – industrial plants to commercial and government labs. The mining and resource sectors are big employers, but they will also find opportunities in agriculture, food and manufacturing. Key industries are rubber, plastics and chemical products. These industries are strongly affected by foreign markets.

Such professionals should have knowledge and skills in:

- analytical instrumentation
- basic, organic, physical, analytical and environmental chemistry
- handling and manipulating chemicals
- laboratory quality control and assurance
- recording, processing and reporting data.

Among the greatest challenges for chemical technologist is keeping up with rapid changes in equipment and technology. Furthermore, some employers may require more specialized training in a particular field such as water sanitation, food processing or pharmaceutical production technology.

Language skills are vitally important. Chemical technologists need to communicate in person and on the phone with team members. The team can include other technologists, technicians, engineers and scientists.

Now, computer knowledge is commonly required for this profession because computerized equipment is used for chemical testing and analysis.

The salary of any chemical technologist will depend on the level of experience and education, the industry he/she works in, as well as geographical location.

Chemical technicians/technologists perform chemical sampling and analysis and are involved in a variety of projects, for example analytical testing, quality control protocols, and product research and development. They often work as members of multidisciplinary teams with chemists, chemical engineers, and other related professions. Chemical technicians/technologists can specialize in a number of disciplines, including environmental testing, mining and exploration, pharmaceuticals, and hazard waste, and opportunities for technicians/technologists can be very diverse depending on the industry and their education.

Imagine you are sitting at your lab bench pipetting a clear solution into a small Erlenmeyer flask. You are a chemical technician/technologist and you are preparing to analyze this solution to determine if there are potentially toxic compounds present at concentrations high enough to make people sick. This sample has been taken from the drinking fountain of one of the country's largest gold mines, where several workers have fallen ill and been hospitalized over the last week. Occupational hygienists at the mine have taken air and water samples and sent them to your lab for analysis. Now your lab is busy trying to determine if the employees' air or water is the cause of their illnesses. As a chemical technician/technologist, you work as part of a team with other technicians, technologists, and supervising chemists. Your team has been assigned to analyze the water sample, so you have been busy prepping equipment, solutions, and reagents for the battery of tests your team will run. You start by testing the water for the presence of cyanide, the highly toxic chemical the mine uses as part of the process of extracting gold from ore. Despite all safety precautions, there is always a chance this poison could have contaminated the drinking water. Following the cyanide test, your team will also test for high levels of chlorine, iron, and manganese as possible culprits, along with bacterial agents such as E. coli or coliform contamination. The mine's employees and owners are hoping your lab can isolate the cause of the illnesses so it can be cleaned up and dealt with and the mine can return to operation.

Stupino Chemical Plant

The production is situated in Stupino of the Moscow Region, a large industrial center. The plant was founded in 1939. It is considered to be one of the oldest enterprises in the city.

Stupino Chemical Plant is an industrial enterprise which is one of the five largest Russian manufacturers of household chemicals, including transnational companies.

Due to high quality control, our products gained consumers' hearts and became a winner in industry competitions multiple times.

We are especially proud of the award People's Choice Brand - Brand No. 1 in Russia, which was presented for Sanfor and Sanita brands deservedly in 2020.

In 2021 Roskachestvo awarded Quality Mark to Sanfor.

In 2017 - Product of the Year award.

Stupino Chemical Plant is a full-cycle production: all processes – from formulation development to packaging and label manufacturing - are collected in one area. This feature allows us not to depend on contractors and carry out our obligations towards partners and consumers to the full extent.

We can develop and produce products for partners using their private label (PL), at that we will take upon ourselves registration of all product sale approvals.

The pride of our plant is its own laboratory, in which new recipes are developed with the assistance of the Research Institute of Household Chemistry, and product tests are carried out. The testing purpose is to make sure that the products do not deteriorate throughout the entire shelf life, bear transportation successfully, and cope with the tasks effectively. All products issued by the plant are undergone an additional test for compliance with OST, TU at the Research Institute for Household Chemistry Rossa and the Research Center Bytkhim.

Warehousing of the enterprise is a complex of 25,000 m^2 area, having double depth of storage, protected from moisture and temperature changes. It contains 4,000 pallet places for output products, as well as areas intended for storage of raw materials. Automated warehouse management systems are used here: for example, a raw material identification system and a video recording system are implemented to minimize the chance of personnel errors.

Additionally, the plant has its own truck fleet for delivering orders throughout Russia, as well as cooperation with reliable transport companies allows us to send products to the former Soviet Union and beyond.

Another division of the plant is a printing house equipped with Swiss machines. The printing house performs all the prepress preparation of labels necessary for printing launch, using its own resources. The machines work at extremely high capacity and can produce up to 1,600,000 labels per a day.