

**General Chemistry**  
**Home tasks**  
**For Foreign students**  
**(Medical faculty)**

**LESSON 1**

**Theme: «The bases of biogenic elements chemistry»**

- 1. Safety measures.**
- 2. Hydrolysis.**
- 3. Complexation reactions.**

**Literature:**

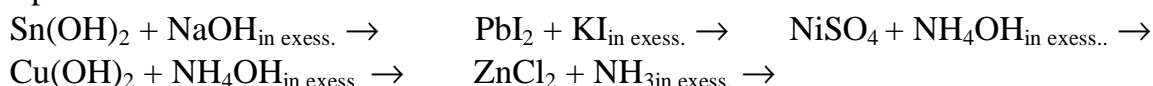
- 1. Essential chemistry for foreign students. p. 106 – 112.**

**LESSON 2**

**Theme: «Introduction to the titration methods of analysis»**

**The different concentration units.**

- 1. Test** (equations of hydrolysis and complexation reactions).
- 2. Laboratory work:** Measuring volumes of solutions in the titration analysis.  
**In the book “Laboratory works and home tasks in general chemistry”:**
  - read and learn the topic p. 4 – 11.
  - learn and memorize the different concentration units and formulas p. 4 – 5.
  - solve problems 2, 3, 4, 6 p. 17 – 18. (standards of problem solutions 1, 2, 3, 4 p. 19 – 20.)
  - answer the test questions p. 16 – 17.
  - get acquainted with the laboratory work p. 13 - 16.
  - write the possible hydrolysis reactions in molecular and ionic forms for the salts cobalt nitrate (II), potassium nitrite, ammonium carbonate, chromium sulfide (III);
  - write the complexation reactions in molecular and ionic forms:



**LESSON 3**

**Theme: «Introduction to the titration methods of analysis»**

- 1. Test** “The different concentration units”.
- 2. Laboratory work:** The preparation of titrants by the dilution of a concentrated solution.  
**In the book “Laboratory works and home tasks in general chemistry”:**
  - read and learn the topic p. 11 – 12.
  - answer the main questions of the topic p. 12 – 13.
  - solve problems 5, 7, 8, 9 p. 18 – 19. (standards of problem solutions p. 19 - 20)
  - get acquainted with the laboratory work p. 30 – 31.

**LESSON 4**

**Theme: «Acid-Base titration»**

- 1. Test** on the theme of the lesson.
- 2. Laboratory work:** Standardization of a titrant with the solution of a primary standard.  
**In the book “Laboratory works and home tasks in general chemistry”:**
  - read and learn the topic p. 21 – 28.
  - answer the main questions of the topic p. 28.
  - solve problems 1, 2, 3, 4, p. 35 – 36. (standards of problem solutions 1, 2, 3, 4, p. 37 – 38.)
  - answer the test questions p. 34 – 35.
  - get acquainted with the laboratory work p. 31 – 33.

## LESSON 5

**Theme: «Oxidation-Reduction titration. Oxidation-reduction processes. The method of half-reaction. Oxidimetry. Permanganatometry»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Determination of the mass of a substance in the given volume of the analyzed solution.

**In the book “Laboratory works and home tasks in general chemistry”:**

- read and learn the topic p. 39 – 51.
- using the electron-ion method (half-reaction method) write OR reactions 1, 2, 3, 4, 5, 6, 7, p. 54 – 55.
- do exercises II and III p. 57 – 58.
- solve problems 2, 3, 5, 6, p. 65 – 66. (standards of problem solutions p. 67 – 68.)
- get acquainted with the laboratory work p. 61 – 62.

## LESSON 6

**Theme: «Oxidation-Reduction titration. Iodometry»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Determination of a substance mass in the sample using iodometry.

**In the book “Laboratory works and home tasks in general chemistry”:**

- read and learn the topic p. 51 - 54.
- answer the main questions of the topic p. 54.
- using the electron-ion method (half-reaction method) write OR reactions 8, 12, 13, 18, 19 p. 55 – 57.
- answer the test questions p. 64.
- solve problems 7, 9, 11 p. 66 – 67. (standards of problem solutions p. 67 – 69.)
- get acquainted with the laboratory work p. 62 – 63.

## LESSON 7

**Theme: «Colligative properties of solutions»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Hemolysis of erythrocytes in hypotonic solution.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 80 – 93.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 80.
- answer the test questions p. 81 – 82.
- solve problems 1-4, 8, 9-11 p.82 – 84 (standards of problem solutions p. 84 – 87).
- get acquainted with the laboratory work p. 80.

## LESSON 8

**Theme: «Acid-Base equilibrium. The pH level of water solutions»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Determination of active acidity of biological fluids.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 93 – 101.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p.88.
- answer the test questions p.96 – 97.

- solve problems 1-4, p. 98 (standards of problem solutions p. 99 – 100).
- get acquainted with the laboratory work p. 95 - 96.

## LESSON 9

**Theme: «Acid-Base equilibrium. Buffer solutions».**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Preparation of buffer solutions and investigation of mechanism of their action.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 101 - 106.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 101.
- answer the test questions p. 102 – 104.
- solve problems 1-4, p. 104 - 105 (standards of problem solutions p. 105 – 107).
- get acquainted with the laboratory work p. 101 - 102.

## LESSON 10

**Theme: «Heterogeneous equilibrium»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Obtaining of heterogeneous systems “precipitate - solution” and the shift of equilibrium in heterogeneous system “precipitate - solution”.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 112 - 120.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 108.
- answer the test questions p. 114 – 115.
- solve problems 1-5, p. 116 (standards of problem solutions p. 117 – 119).
- get acquainted with the laboratory work p. 108 – 110. Task 1, task 2 (only experiments 2 and 3).

## LESSON 11

**Theme: «Chemical Thermodynamics»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Determination of the heat effect of neutralization reaction.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 34 - 59.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 70.
- answer the test questions p. 72 – 74.
- solve problems 1-5, p. 74 - 75 (the table of standard  $H_f^0$ ,  $S_f^0$ ,  $G_f^0$  p. 75).
- get acquainted with the laboratory work p. 70 – 72.

## LESSON 12

**Theme: «Chemical Kinetics»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** The influence of sodium sulfite concentration on the rate of the sulfite oxidation reaction by potassium iodate in the acidic medium.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 59 - 79.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 76.

- answer the test questions p. 77 – 78.

- solve problems 1, 2, p. 78 (standards of problem solutions p. 79).

- get acquainted with the laboratory work p. 76 – 77.

### LESSON 13

**Theme: «Electric conductivity of electrolyte solutions»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Conductometric determination of the dissociation degree and the constant of acetic acid dissociation.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 121 - 128.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 120.

- answer the test questions p. 122 – 123.

- solve problems 1, 2, p. 123 (standards of problem solutions p. 123 - 125).

- get acquainted with the laboratory work p. 120 – 121.

### LESSON 14

**Theme: «Electrochemistry. Potentiometry»**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Determination of a weak acid solution concentration and its dissociation constant by the potentiometric titration.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 128 - 138.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 126.

- answer the test questions p. 128 – 129.

- solve problems 1-5, p. 129 – 130 (standards of problem solutions p. 130 – 132).

- get acquainted with the laboratory work p. 126 – 128.

### LESSON 15

**Theme: «Physical Chemistry of surface phenomena».**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Determination of the dependence of the surface tension of solutions on the length of the hydrocarbon chain.

Lecture material.

**In the book: “Essential chemistry for foreign students”:**

- read and learn the topic p. 138-147.

**In the book: “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 133.

- answer the test questions p. 136 – 139.

- solve problems 1, 2, 3 p. 139 (standards of problem solutions p. 140 - 141).

- get acquainted with the laboratory work p. 133 – 134.

## LESSON 16

**Theme: «Physical chemistry of dispersed systems. Colloid solutions and their properties. The stability and coagulation of dispersed systems».**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** The preparation of colloid solutions by the method of condensation and the investigation of their optical properties.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- read and learn the topic p. 157 - 164.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 142.

- answer the test questions p. 145 – 149.

- solve problems 1 - 6 p. 150 - 151 (standards of problem solutions p. 151 - 152).

- get acquainted with the laboratory work p. 142 – 144.

## LESSON 17

**Theme: «Physical Chemistry of solutions of biopolymers».**

**1. Test** on the theme of the lesson.

**2. Laboratory work:** Determination of the swelling degree of gelatin at different pH levels.

Lecture material.

**In the book “Laboratory works and home tasks in general chemistry”:**

- answer the main questions of the topic p. 153.

- answer the test questions p. 154 – 156.

- solve problems 4,5,7-11 p. 157-158 (standards of problem solutions p. 158 - 159).

- get acquainted with the laboratory work p. 153 – 154.

## LESSON 18

### FINAL TEST.

Lecture material.

**In the book “Essential chemistry for foreign students”:**

- chapters 3 – 10, 11.

**“Laboratory works and home tasks in general chemistry”.**

**Credit will be received by all students**

- who have attended all lectures;

- who have done all laboratory works;

- who have done final test.



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**LESSON 2**

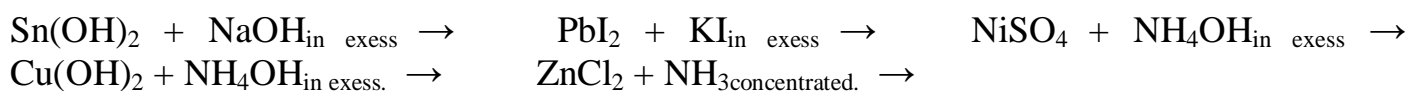
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### LESSON 3

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**Theme: «Oxidation-Reduction titration. Oxidation-reduction processes. The method of half-reaction. Oxidimetry. Permanganatometry»**

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- do exercises II and III p. 57 – 58.

- solve problems 2, 3, 5, 6, p. 65 – 66. (standards of problem solutions p. 67 – 68.)

- get acquainted with the laboratory work p. 61 – 62.