# EDUCATIONAL  PRACTICE ON  MEDICAL  INFORMATICS

*Teaching aids for students studying in English*

FEDERAL STATE BUDGETARY EDUCATIONAL INSTITUTION
OF HIGHER EDUCATION «BASHKIR STATE MEDICAL UNIVERSITY»
OF THE MINISTRY OF HEALTHCARE OF THE RUSSIAN FEDERATION
(FSBEI HE BSMU MOH Russia)

# EDUCATIONAL PRACTICE

# ON MEDICAL INFORMATICS

*Teaching aids for students studying in English*

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This manual was compiled in accordance with the Federal State Educational Standard of Higher Education, the syllabus in Medical Informatics and the requirements of the Bashkir State Medical University for students of medical specialities studying Medical Informatics. The described topics are destined to first year students studying Medical Informatics in English. The teaching aids must be used as the key reference to accomplish the course.

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# УЧЕБНО-МЕТОДИЧЕСКОЕ ПОСОБИЕ

# ПО МЕДИЦИНСКОЙ ИНФОРМАТИКЕ

*для студентов, обучающихся на английском языке*

Данное пособие составлено в соответствии с Федеральным государственным образовательным стандартом высшего образования, рабочей программой дисциплины «Медицинская информатика» и требованиями Башкирского государственного медицинского университета по специальности «Лечебное дело». Изложенный материал предназначен для студентов первого курса, которые изучают медициинскую информатику на английском языке. Пособие необходимо использовать в качестве основного источника литературы для освоения дисциплины.

Рекомендовано в печать Координационным научно-методическим советом и утверждено решением Редакционно-издательского совета ФГБОУ ВО БГМУ Минздрава России.

# CONTENTS

# INTRODUCTION

Medical Informatics is the intersection of information science, computer science, and health care. This field deals with the resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in health and biomedicine.

The course of Medical Informatics is the intersection of two aspects. The first aspect deals with the systematic and information world view, general information regularities of the structure and functioning of the self-operating systems. The second aspect deals with the methods and tools of receipt, translation, communication, storing and use of information, solving of problems by computers and other tools of new information technologies.

The main purpose of our book of teaching aids is to teach Medical students to be competent with standard professional tasks.

The teaching process of our department is aimed to form the following competencies:

general cultural skills no. 1 (GCS-1): ability to abstract thinking, analysis, synthesis;

general cultural skills no. 5 (GCC-5): readiness for self-development, self-realization, self-education, use of creativity;

general professional skills no. 1 (GPS-1): willingness to solve standard tasks of professional activity using information, bibliographic resources, medical and biological terminology, information and communication technologies and taking into account the basic information security requirements;

general professional skills no. 7 (GPS-7): readiness for the use of basic physicochemical, mathematical and other natural science concepts and methods in solving professional problems;

professional skills no. 21 (PS-21): ability to participate in scientific research.

# INSTRUCTIONS

The study of Medical Informatics comprises listening to lectures, self-learning in workbooks and carrying out written tests, laboratory work and the final test.

The lecture course in Medical Informatics is taught to first-year students during the spring semester. The purpose of lectures is to introduce students Medical Informatics, bibliography, deadlines for the individual tasks, requirements to execution or written tests and other organizational matters. Some theoretical insights, recommendations for lecture outlines and solutions of standard problems are considered during the lecture course.

Self-learning represents the key point during the course study, and must be accomplished on the basis of the recommended references.

The written test consists of two parts.

Part I – called "Making the Integrated Medical Documents"employs common software (spreadsheets like Microsoft Excel, text and chart editors) for execution of medical documents, creating tables, graphs and diagrams.

Part II is called "Mathematical Statistics Problem Solving", and includes the description of four principle ways of research in medicine.

Tasks' numbers are selected from the given table for all variants of the written test accordingly to the last numerical in the code number. Carrying out of the tasks should be started after the theoretical study of the subject. It is recommended to send the fulfilled tasks to the university till the 1st of March in the current year.

The study of the course is closed by the final test, which only those students who successfully fulfilled laboratory work and tests on practical lessons as well as on the course of lectures are allowed to. The student which fulfilled the written test and passed the test on laboratory training session is allowed to the final test. The final test is taken only in the teaching institution. Taking of the final test in other educational institutions is not accepted.

# GENERAL THEORY AND NOTATIONS

## PART 1. INTEGRATED MEDICAL RECORDS

The teaching process is aimed at the formation the following skills for students: general cultural skills 1, 5; general professional skills 1, 7; professional skills 21.

All information which is used in public healthcare services can be conditionally divided into the following parts:

1. *Scientific information* (publications on current state of medical science and practice, achievements in the field of Para clinical and the fundamental sciences connected with medicine, last achievements in the field of diagnostics, treatment, prophylaxis, working out of new medical devices, etc.).

2. *Medical documentation* (information, which is connected with medical aid rendering and registered in standard medical documents).

3. *Statistical information* (revealing of laws and tendencies in indicators of health of the whole population and its separate groups on the basis of studying of mass processes and the phenomena in medicine and public health services; estimation of condition and dynamics of progress of public health services and medical personnel).

4. *Economic information* (data on cost of medical products, medical services, medical techniques, diagnostic procedures and other aspects of financing of medicine and public health).

5. *Advertising information* (data on new technologies, medicines, equipment, etc.).

The important place in this classification is occupied with the medical documentation as it's correct conducting allow to define requirements of the population for medical aid, its planning, the organization and management of public health services.

***Medical record documentation*** is the documentary system of the established form, intended for the data recording, reflecting character, volume and quality of the medical aid rendered to certain groups of the population or separate persons.

According to the destination medical documents are divided into three groups. Records of supervision over a patient condition during its treatment and medical-diagnostic appointments are related to *Group 1*. "The medical card of the inpatient", "The medical card of the outpatient", "The history of the child development", "The history of the newborn development", "The history of birth development", etc.

*Group 2* contains data on patients and provides continuity and intercommunication between separate stages of rendering of medical aid. For example, "The extract from a medical card of the outpatient, the inpatient", "The emergency notices on an infectious disease, food, acute professional poisoning, and unusual reaction to a vaccination".

The journals reflecting the volume of work performed by medical staff concern *Group 3*, e.g., "The journal of the polyclinic (ambulance station, clinic, hospital) doctor".

Standard medical documentation includes the following elements: the hospitalization date, the diagnosis at hospitalization, the anamnesis, the data of medical examination and laboratory inspections, treatment, a clinical course, discharge date, the diagnosis at discharge and epicrisis. Minimal set of identifying indicators in medical documents contains the registration date of the document, surname, name, sex, age, date of birth, place of birth, home address.

Data, which are necessary for public health management includes sex, age, marital state, diagnosis at discharge in the codes of the International Classification of Diseases (ICD), cause of trauma in ICD codes, operations in codes of the International classification of Procedures in Medicine (ICPM), number of days of hospitalization. ICPM is published by WHO and classifies

procedures that are used in different fields of medicine (surgical, roentgenologic, laboratory, prophylactic, etc.).

All medical data must be verified. Wrong information in the medical document can lead to the false conclusion. Information will be incorrect due to wrong record as well as wrong coding. Diagnosis can be verified by other medical workers which control randomly chosen medical documents.

Medical information about a patient must be confidential. Confidential medical information should be reported only to the persons who are in need of it. For instance, a visiting nurse should know the patient's surname and address, but she shouldn't know the patient's case history. If information about the patient is necessary to be published then his identifying data should be given in the coded form.

Medical document has certain restrictions as the information source for the public health management, namely medical documentation don't cover all cases of the disease, embarrassing and disputable diagnoses aren't mentioned in the documents, data that have been given by the patient itself, especially anamnestic, are subjective.

Forms of presentation of medical information are rather various. One may single out text, graphic and audio forms. Such medical documents of the selected tree groups as printed papers and manuscripts are attributed to the carriers of text medical information. Tomograms, X-ray images, echograms, photos, film frames, plots, curves, etc. represent the carriers of graphical information. The collected data must be organized in such a way to represent information in such a way to give the possibility of dynamic structure clear view and to examine medical history. Statistical data can be represented in the following ways:

– charts (diagrams);

– cartograms;

– maps.

Graphical images should be done according to the following rules:

1. Right choice of a type of a graphical image.

2. Text, explaining a graphical image.

3. Define the scale.

4. Putting of conventional signs on a graph.

The largest group of graphical image is presented by charts.

***The chart*** is the graphic image visualizing the relationship between different values by linear segments or geometrical figures.

Charts have a number of advantages.

1. Statistical data analysis is easier and deeper.

2. Perception of data of statistical analysis is easier to a researcher or a reader.

3. Operative management is easier and the dynamics of plan execution and either aspects of public medical service are visualized.

4. The course of work of medical and prophylactic services  is visualized.

There are different types of charts:

1. Linear charts: a) lines; b) radar.

2. Plane charts: a) rectangular (columns, stacked columns, bars); b) pie (sector).

3. Figured charts.

Volume charts (spheres, vessels, cubes, etc.).

***Linear charts.*** The linear chart is used for illustration of the frequency of phenomenon changing in time (the dynamics of indicators of natural movement of population, sickness rate, changes in the net of medical establishments, etc.). Absolute, average and intensive values are presented in the linear chart. Fig. 1. shows a linear chart.

**Decreasing of the volume of forced exhalation (VFE) in the norm**
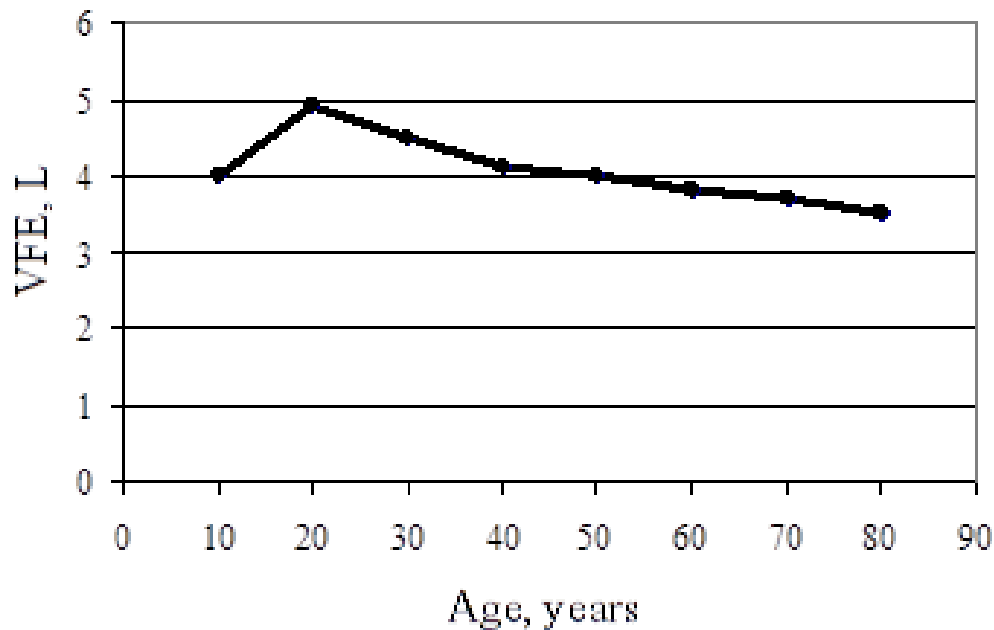


Fig. 1. Linear chart.

***Radar charts.*** Radar (or polar) charts are the type of linear chart, which are plotted in polar coordinates. Periodic phenomena are illustrated on that type of charts (monthly phenomenon distribution, change of the seasons, by hours, etc.). The circumference is used as an abscissas axis and is divided to the identical parts accordingly to the periodicity of the phenomenon being examined. (12 points for a year, 24 points for twenty-four hours, etc.). The circumference radius or its extension is used as an ordinates axis. The average value of the phenomenon of analyzed time cycle is taken as a radius of a circumference.

**Replacement of strophanthine by lanatoside C ( mg) in the first week after the last strophanthine injection**
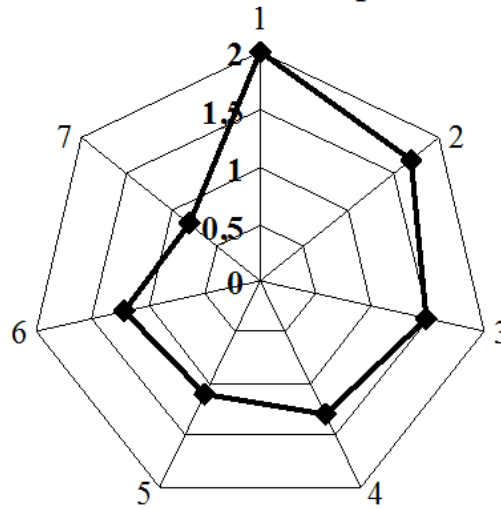


Fig. 2. Radar chart.

The number of radii corresponds to time intervals of the examined process. By default, the radar line representing the first point is drawn vertically at 90 degrees (Fig. 2).

***Plane charts*** can be rectangular (columns, stacked columns, bars) and sector (pie).

***Columns charts*** are used for illustration of absolute and average values and intensive indicators. The principle of plotting of column chart is the same as that discussed for linear chart. The columns bases are on the abscesses axis, values of the examined feature, namely the columns heights are on the ordinate axis. Width of the columns and the distances between them should be equal and of arbitrary value. Heights of the columns depend on the value of the visualized phenomenon. Fig. 3 shows a column chart, and fig. 4 shows a bar chart.

**Prevalence frequency of isolated systolic arterial hypertension**



Fig. 3. Column chart

**Mortality due to chronic obstructive lungs diseases depending on age among women (in 100000 per.)**
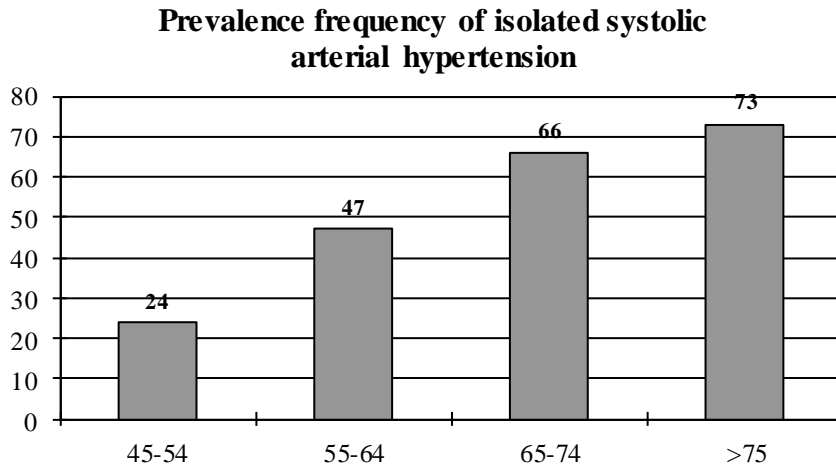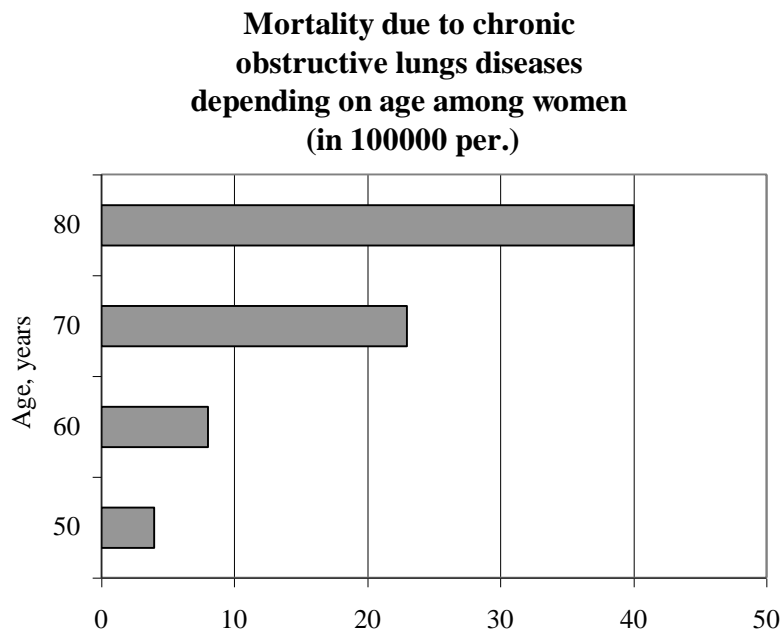


Fig. 4. Bar chart

*Pie (sector) charts* are used for presentation of composition and structure of the phenomenon (sickness rate, causes of mortality, etc.). The circumference in a pie chart is taken for 100%, 1% corresponding to 3.6o. Figs. 5 and 6 show pie charts.

**Summary clinical effectivness of rovamycine at treatment of patients sicked by out-of-hospital pnewmonia**
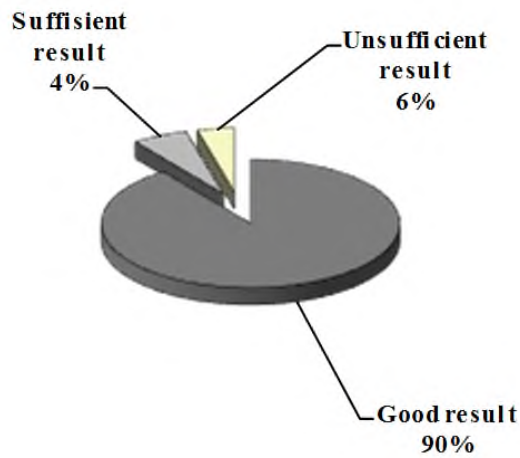


Fig. 5. Exploding pie chart

**Results of phlegm microbiological tests of patients sicked by out-of-hospital pnewmonia**
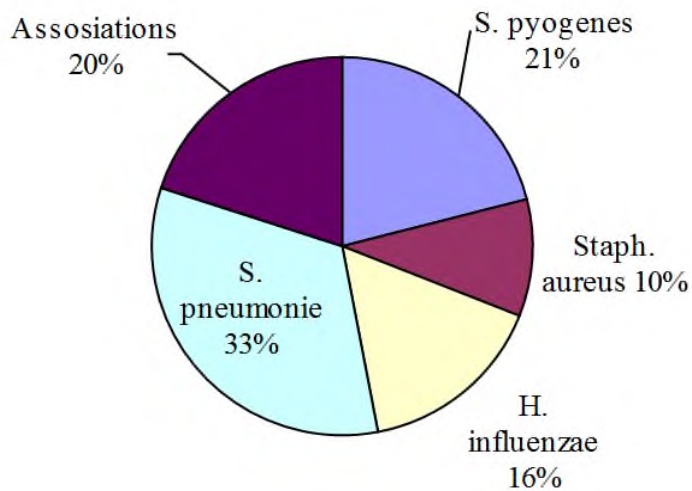


Fig. 6. Pie chart

***Volume charts.*** Volume charts show the obtained data in the form of geometrical figures (sphere, cube, pyramid, vessel and so on). The can be used to illustrate sizes of phenomena (fig. 7).

**Change of concenration of sodium ions in a plasma
under the influence of captopril (meqv/l)**
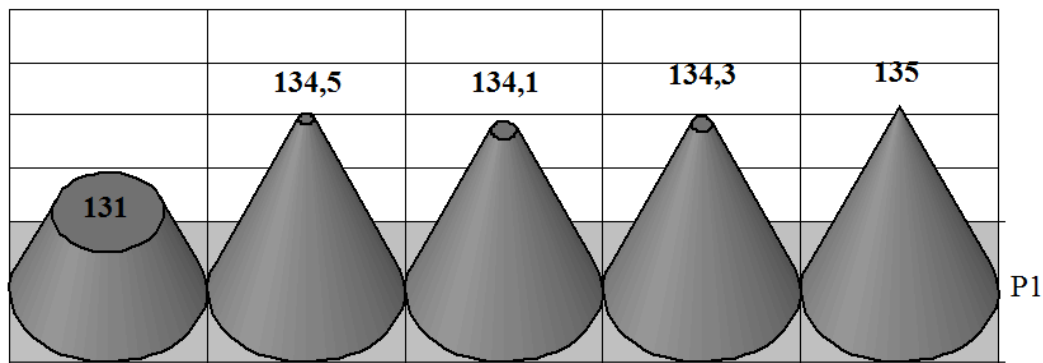


Fig. 7. Volume chart

***Figured charts.*** Figured charts are used for illustration of phenomenon prevalence during various time periods or geographic areas. These charts illustrate statistical data in the form of figures and are of great obviousness.

***Cartogram*** is a schematic base map of the area, in which different levels (values) of some phenomenon are illustrated by shading or different tints of the same colour. Such illustration gives obvious view about the territorial prevalence of the examined phenomenon in absolute or relative values.

***Map cartogram*** is the reunion of geographic map with charts which are mostly of the column type. Columns of different size are put on the map of the area that they represent. The pie diagram is also can be used.

The table method of working out the documents is widespread in medicine. Each table should have the number, common title, rows and columns titles, Subject and predicate are distinguished in tables. Subject is usually a main attribute and predicate contains features that are determined by the subject. Subject is usually allocated on vertical and predicate is on horizontal of a table. There are tree types of statistical tables, namely simple, groupal and combination.

***Simple*** table is the table, where the subject is not structured by categories (e.g., Tab. 1).

Table 1

**Main description of patients**

**with chronic obstructive pancreatitis**

| Index | Patient quote, % |
|---|---|
| Age less than 40 years | 10 |
| Age greater than 40 years | 90 |
| Acute pancreatitis in the anamnesis | 40 |
| Calcifications in ducts | 40.9 |
| Odditis /papillitis | 46.5 |
| Ampuloma | 4.5 |
| Hypertrophy of the sphincter of Oddi | 9.0 |

*Group* table is a table, where the subject is characterized by two connected attributes (Tab. 2). The connected attributes are the type of hepatitis and drug dose.

Table 2

**Treatment scheme for chronic hepatitis (CH) by interferon**

**and frequency of positive results of treatment**

| Type of hepatitis | Interferon doses | Treatment duration, months | Positive results, % |
|---|---|---|---|
| CH-B | 5 IU daily | 4 | 37 |
| | 10 IU 3 times per week | 4 | 40 |
| | 9 IU 3 times per week | 6 | 19 |
| CH-D | 5 IU daily | 12 | 21 |
| | 10 IU 3 times per week | 12 | 50 |
| CH-C | 3 IU 3 times per week | 12-18 | 40 |

*Combination* is the table in which the subject and the predicate are described by three or more connected attributes (Tab. 3).

Table 3

**Scheme of treatment of a bronchial asthma by theotard**

| Type of release | Age and weight | Dose per 24-hours | |
| --- | --- | --- | --- |
| | | Initial dose | Continued treatment |
| Theotard 200 | Kids weighting more than 20 kg | 1 pill in the evening | 1 pill in every 12 hours |
| | Adults with low weight | 1 pill in the evening | 1 pill in every 12 hours |
| Theotard 300 | Adults and kids weighting more than 40 kg | 1 pill in the evening | 1 pill in every 12 hours |

QUESTIONS: (The teaching process is aimed at the formation the following skills for students: general cultural skills 1, 5; general professional skills 1, 7).

What keys are used to delete characters, and what are the differences in their functions?

1. How can you select a piece of the text with the mouse? How can you select a piece of the text using the keys?

2. Is it possible to enter user data when inserting a Microsoft Graph object?

3. How can you insert a picture into the text as a frame?

4. What is Microsoft WordArt used for?

5. What is the way to do the numbering of headings?

## 1.1. PLOTTING OF TABLES AND CHARTS DESCRIBING DATA ON LABORATORY TESTS OF A PATIENT

EXAMPLE. Patient A. The following laboratory tests have been conducted during period of hospitalization.

Day 1 after hospitalization: leukocytes in blood – $14 \times 109$ per litre, summary activity of lactate dehydrogenise (LDH) – 207 IU, enzyme LDH 1 –

20% from summary, creatine phosphokinase (CPK) – 440 IU, activity of aminosuccinamic aminotransferase (AST) – 100 IU.

Day 2 after hospitalization: leukocytes – 9.5×109 per litre, LDH – 250 IU, LDH 1 – 28% from summary CPK – 220 IU, AST – 250 IU.

Day 3 of hospitalization: leukocytes – 9×109 per litre, LDH – 290 IU, LDH 1 – 32% from summary CPK – 180 IU, AST – 150 IU.

Day 5 of hospitalization: leukocytes – 8.1×109 per litre, LDH – 400 IU, LDH 1 – 40% from summary CPK – 120 IU, AST – 30 IU.

For the better view of the data of the test for enzyme activity of the patient blood and its estimation represent the results in a form of table and chart.

CREATING AN EXCEL TABLE

1. Launch text redactor Microsoft Office Word.

2. Give the command for creating a new document: Файл - Создать - Новый документ.

3. Set the page parameters: Разметка страницы - Параметры страницы. In sheet «Paper» set «Paper size» equal to A4 in the opening list (this is the format 210×297 mm, accepted as standard). In the case of usage of custom format one chooses item Custom size and set its parameters using bottoms "Height" and "Width". In sheet "Margins" set the orientation of the paper («portrait» or «landscape»). In our case portrait orientation is preferred. If the width of the table is large the landscape orientation is preferred. Set margin sizes:

- left – 2.5 cm;
- right – 1.5 cm;
- top – 1.5 cm;
- bottom – 2.0 cm.

4. Input the title of the table ("Table 4"): «The Results of Laboratory Examinations of Patient A».

5. For the best presentation apply bold formatting to the title of the. First, select the title by using the mouse. Then click: Главная – Шрифт. Select the necessary font size (14 points for the title).

6. Insert a framework of the table. Place the cursor under the title of the table. Then click: Вставка -Таблица. Select the number of columns and rows in the appeared dialog box. Taking into account that the columns' and rows' titles, the results of 4 days of hospitalization and their norm should be presented in the table, there are 6 columns and 7 rows in our case.

| | | | | | |
|---|---|---|---|---|---|
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| | | | | | |
| | | | | | |

7. Table filling example

Table 4

**Laboratory Tests Results. Patient A.**

| Index | Norm | Day of the hospitalization | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 5 |
| Leukocytes (per l) | 4-9×109 | 14×109 | 9.5×109 | 9×109 | 8.1×109 |
| LDH (IU) | less than 225 | 207 | 250 | 290 | 400 |
| LDH1 (% of sum.) | 19-29 | 20 | 28 | 32 | 40 |
| CPK (IU) | 20-110 | 440 | 220 | 180 | 120 |
| AST (IU) | 5-25 | 100 | 250 | 150 | 30 |

CREATING CHARTS FROM TABLE DATA

Charts are convenient means of data visualization and are wildly used in medical documentation equally with tables. Text processor Microsoft Word has the enable tool Microsoft Graf for creating charts. This software is an outer component and its installation should be specially ordered at the text processor installation.

Text editor Microsoft Word offers two ways to paste a chart in the document. The most common way is based on that some arbitrary chart connected with an arbitrary data table is inserted into a document. Then the customization of the chart is done, which consist of adjustment of its appearance and content editing. As the content is based on the table, so it is edited by filling that table with necessary data.

The second, special, method is based on that the chart is created on the basis of some certain table in the document. In this case the chart customization consists of only its appearance adjustment. This way is more convenient. Let's consider the way of creation of charts on the basis of the tables in the document.

1. Put the cursor in the area of the table and select the.

2. Put the cursor below the table and insert a basic chart by command: *Вставка → Объект → Диаграмма Microsoft Graph.* Next to the chart its basic table (datasheet) will appear.

3. Select the contents of the datasheet by twice clicking on the cell at intersection of rows' and columns' titles in the top left corner.

4. Replace the contents of the basic table by the contents of your table by using the command of insertion from the clipboard.

5. Click on the empty area of the page by left mouse button. The program will automatically returns from Microsoft Graph Chart into Word redactor. Pay attention one how the chart has changed. Now it corresponds to the table contents.
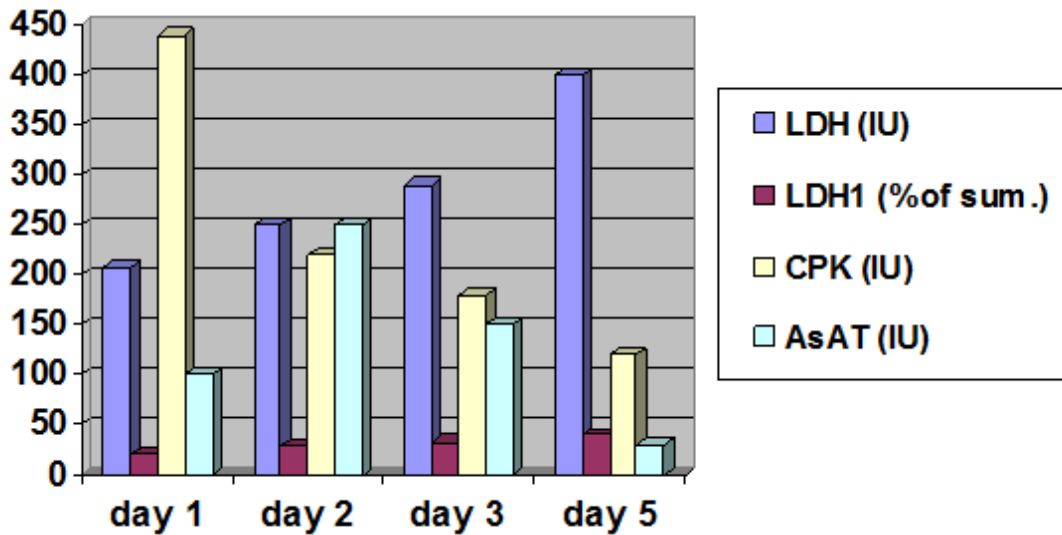
Fig. 10. The pattern of a chart.

Thus, presentation of the patient's biochemical tests in the form of table and chart improved the clearness of illustrating of a dynamics of blood ferments' activity and facilitates the revelation of hyperfermentation symptom, confirming the diagnosis of myocardial infarction of patient A.

For further guiding of the patient a daily control of its health state is necessary with the presentation of a material of the same kind. Filling of a pattern of the journal of examination of a patient can be offered for facilitation of the execution of this procedure. Main attributes are presented in this journal, and a doctor needs only to select and underline them.

**TABLE OF VARIANTS**

| Variant no. | Part 1 | | Part 2 | | | |
|---|---|---|---|---|---|---|
| | Task 1.1. | Task 1.2. | Task 2.1. | Task 2.2. | Task 2.3. | Task 2.4. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 01 | 1.1[1] | 1, 2, 3 | 1 | 2 | 3 | 4 |
| 02 | 2.2 | 4, 5, 6 | 5 | 6 | 7 | 8 |
| 03 | 3.3 | 7, 8, 9 | 9 | 10 | 11 | 12 |
| 04 | 4.2 | 10, 11, 12 | 13 | 14 | 15 | 16 |
| 05 | 5.3 | 13, 14, 15 | 17 | 18 | 19 | 20 |
| 06 | 6.2 | 16, 17, 18 | 21 | 22 | 23 | 24 |
| 07 | 7.1 | 19, 20, 21 | 25 | 26 | 27 | 28 |
| 08 | 8.1 | 3, 5, 22, | 29 | 30 | 1 | 2 |
| 09 | 9.2 | 7, 9, 11 | 3 | 4 | 5 | 6 |
| 10 | 10.1 | 13, 15, 17 | 7 | 8 | 9 | 10 |
| 11 | 11.1 | 19, 20,22 | 11 | 12 | 13 | 14 |
| 12 | 12.2, 12.3 | 2, 4, 6 | 15 | 16 | 17 | 18 |
| 13 | 13.3 | 8, 10, 12 | 19 | 20 | 21 | 22 |
| 14 | 14.4 | 14, 16, 18 | 23 | 24 | 25 | 26 |
| 15 | 15.4 | 2, 20, 22 | 27 | 28 | 29 | 30 |
| 16 | 16.2 | 3, 6, 9 | 2 | 3 | 4 | 5 |
| 17 | 17.1 | 12, 15, 18 | 6 | 7 | 8 | 9 |
| 18 | 18.2 | 4, 8, 12 | 10 | 11 | 12 | 13 |
| 19 | 19.1, 19.2 | 7, 16, 20 | 14 | 15 | 16 | 17 |
| 20 | 20.2 | 1, 4, 7 | 18 | 19 | 20 | 21 |
| 21 | 21.2 | 10, 13, 16 | 22 | 23 | 24 | 25 |
| 22 | 22.1 | 5, 19, 22 | 26 | 27 | 28 | 29 |
| 23 | 2.2 | 2, 5, 8 | 30 | 1 | 2 | 3 |
| 24 | 4.1 | 11, 14, 17 | 4 | 5 | 6 | 7 |
| 25 | 6.3 | 11, 19, 20 | 8 | 9 | 10 | 11 |
| 26 | 7.3 | 1, 6, 11 | 12 | 13 | 14 | 15 |
| 27 | 10.2 | 7, 16, 21 | 16 | 17 | 18 | 19 |
| 28 | 12.1 | 2, 7, 12 | 20 | 21 | 22 | 23 |
| 29 | 14.3 | 1, 17, 22 | 24 | 25 | 26 | 27 |
| 30 | 16.3 | 3, 8, 13 | 28 | 29 | 30 | 1 |
| 31 | 18.1 | 1, 11, 18 | 2 | 4 | 6 | 8 |
| 32 | 20.1 | 4, 9, 14 | 10 | 12 | 14 | 16 |
| 33 | 22.2 | 9, 19, 21 | 18 | 20 | 22 | 24 |
| 34 | 1.2 | 5, 10, 15 | 26 | 28 | 30 | 3 |
| 35 | 3.2 | 6, 11, 17 | 5 | 7 | 9 | 11 |
| 36 | 5.3 | 1, 8, 15 | 13 | 15 | 17 | 19 |
| 37 | 7.2 | 2, 9, 16 | 21 | 23 | 25 | 27 |

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[1] The first number is a number of a extract from the case record, the second number is a number of a test (analysis), which data should be presented in the form of tables and charts. For example, "1.1" means that at fulfilling task no. 1.1 all qualitative data from the case record no. 1 (p. has to be presented in the form of tables. Here, at fulfilling task no. 1.2. charts have to be plotted for the results of test no. 2.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 38 | 9.4 | 3, 11, 19 | 29 | 2 | 4 | 6 |
| 39 | 11.3 | 4, 12, 20 | 8 | 10 | 12 | 14 |
| 40 | 13.3 | 5, 12, 19 | 16 | 18 | 20 | 22 |
| 41 | 15.4 | 1, 10, 20 | 24 | 26 | 28 | 30 |
| 42 | 17.1 | 13, 21, 9 | 1 | 3 | 5 | 7 |
| 43 | 20.1 | 6, 17, 2 | 9 | 11 | 13 | 15 |
| 44 | 21.1 | 11, 13, 10 | 17 | 19 | 21 | 23 |
| 45 | 1.2, 1.3 | 15, 7, 9 | 25 | 27 | 29 | 2 |
| 46 | 2.3, 2.4 | 2, 14, 21 | 4 | 6 | 8 | 10 |
| 47 | 3.1 | 4, 7, 16 | 12 | 14 | 16 | 18 |
| 48 | 4.2 | 1, 15, 21 | 20 | 22 | 24 | 26 |
| 49 | 5.1 | 3, 13, 22 | 28 | 30 | 3 | 5 |
| 50 | 6.2 | 7, 17, 19 | 7 | 9 | 11 | 13 |
| 51 | 7.3 | 6, 15, 20 | 15 | 17 | 19 | 21 |
| 52 | 8.1 | 9, 12, 18 | 23 | 25 | 27 | 29 |
| 53 | 9.1 | 5, 12, 17 | 6 | 8 | 10 | 12 |
| 54 | 10.3 | 11, 15, 19 | 14 | 16 | 18 | 20 |
| 55 | 11.2 | 2, 15, 18 | 22 | 24 | 26 | 28 |
| 56 | 12.4 | 17, 21, 4 | 30 | 1 | 2 | 4 |
| 57 | 13.1 | 3, 7, 18 | 3 | 5 | 7 | 9 |
| 58 | 14.2 | 5, 11, 16 | 11 | 13 | 15 | 17 |
| 59 | 15.3 | 4, 14, 22 | 19 | 21 | 23 | 25 |
| 60 | 16.1 | 10, 15, 21 | 27 | 29 | 1 | 4 |
| 61 | 17.3 | 8, 19, 22 | 8 | 12 | 16 | 20 |
| 62 | 18.1 | 4, 8, 15 | 24 | 28 | 3 | 7 |
| 63 | 19.1, 19.2 | 3, 14, 18 | 11 | 15 | 19 | 23 |
| 64 | 20.1 | 6, 12, 17 | 27 | 2 | 6 | 10 |
| 65 | 21.3 | 5, 10, 18 | 14 | 18 | 22 | 26 |
| 66 | 22.3 | 4, 17, 21 | 30 | 1 | 5 | 9 |
| 67 | 1.1 | 2, 5, 9 | 13 | 17 | 21 | 25 |
| 68 | 14.5 | 4, 8, 18 | 29 | 4 | 8 | 12 |
| 69 | 7.2 | 10, 12, 19 | 16 | 20 | 24 | 28 |
| 70 | 10.4 | 7, 15, 17 | 3 | 7 | 11 | 15 |
| 71 | 13.2 | 1, 11, 18 | 19 | 23 | 27 | 2 |
| 72 | 16.2, 16.4 | 1, 10, 14 | 6 | 10 | 14 | 18 |
| 73 | 19.1, 19.2 | 7, 8, 15 | 22 | 26 | 30 | 1 |
| 74 | 2.1 | 12, 18, 21 | 5 | 9 | 13 | 17 |
| 75 | 5.2 | 9, 14, 17 | 21 | 25 | 29 | 8 |
| 76 | 8.2 | 8, 18, 21 | 12 | 16 | 20 | 24 |
| 77 | 11.1 | 1, 4, 9 | 28 | 4 | 7 | 11 |
| 78 | 14.1 | 11, 15, 20 | 15 | 19 | 23 | 27 |
| 79 | 17.2 | 7, 14, 19 | 4 | 8 | 12 | 16 |
| 80 | 13.3 | 2, 8, 16 | 20 | 24 | 28 | 3 |
| 81 | 3.3 | 4, 7, 18 | 7 | 11 | 15 | 19 |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 82 | 6.1 | 10, 16, 22 | 23 | 27 | 2 | 6 |
| 83 | 9.3 | 4, 9, 12 | 10 | 14 | 18 | 22 |
| 84 | 12.1 | 5, 9, 17 | 26 | 30 | 11 | 15 |
| 85 | 15.2 | 7, 11, 18 | 19 | 23 | 27 | 3 |
| 86 | 18.1 | 1, 11, 21 | 7 | 5 | 9 | 13 |
| 87 | 21.2 | 2, 17, 19 | 17 | 1 | 17 | 21 |
| 88 | 14.5 | 3, 9, 13 | 25 | 29 | 10 | 14 |
| 89 | 15.4 | 5, 16, 18 | 18 | 22 | 26 | 30 |
| 90 | 5.3 | 6, 18, 21 | 2 | 6 | 15 | 19 |
| 91 | 9.4 | 7, 19, 20 | 23 | 3 | 7 | 11 |
| 92 | 13.3 | 10, 5, 13 | 22 | 26 | 30 | 2 |
| 93 | 17.1 | 11, 18, 20 | 27 | 6 | 10 | 14 |
| 94 | 21.1 | 13, 19, 21 | 29 | 18 | 26 | 22 |
| 95 | 5.3 | 4, 15, 11 | 5 | 15 | 25 | 30 |
| 96 | 10.2, 10.4 | 7, 12, 19 | 7 | 12 | 17 | 22 |
| 97 | 15.1 | 3, 7, 20 | 10 | 20 | 15 | 25 |
| 98 | 20.2 | 8, 10, 15 | 8 | 16 | 24 | 7 |
| 99 | 12.2, 12.3 | 6, 20, 8 | 3 | 11 | 19 | 27 |
| 100 | 16.4 | 3, 9, 14 | 2 | 10 | 18 | 26 |

## TASK 1.1.

*QUESTIONS:* (The teaching process is aimed at the formation the following skills for students: general professional skills 1, 7).

Make a processing of medical documentation according to the EXAMPLES given above by using the following EXTRACTS FROM THE CASE RECORDS.

Present the data of laboratory tests of a case record, corresponding to the TABLE VARIANTS id. number by using text redactor Microsoft Word.

Plot the following charts according to the corresponding test by using internal redactor Microsoft Graf Chart. Processing of the results should be done in the following way.

If a test was done repeatedly, the dynamics of each parameter should be retraced separately (students select a type of the chart themselves). Here each chart should be of its own type. Data in the chart should be grouped so that it will be possible to retrace the dynamics of each parameter.

If a test was done once, a comparative chart relative to the norm should be done, the upper limit of the norm to be taken as a parameter;

If there is a leukocyte formula in the test, the pie charts are to be done for the first and last days of hospitalization.

## EXTRACTS FROM THE CASE RECORDS[2]

**1. Clinic of Bashkir State Medical University. Cardiology Department.**

Patient Ivanova A.A.

Card no. – 2324. Room number – 34. Ward – 5.

Age: 69

Sex: female

Address: Ivanovo, Archangelskaya str., 2

Admission date: 7.03.2001

Discharge date: 2.04.2001

Diagnosis of referring institution: hospitalized in the scheduled order

Main disease: atherosclerosis, atherosclerotic cardiosclerosis, atherosclerosis of vessels of lower extremities

Complication: chronic ischemic disease

Coexistent disease: right shoulder joint bruise

General inspection.

Patient condition reports are satisfactory, consciousness and clear. The patient's position is active. The look is quiet. The constitution is regular. The constitution is of normosthenic type. The body temperature is $36.6^0$C. Height: 164 cm. Weight: 59 kg.

The coverlet's colour is common, but pale on the lower extremities. Rash, scars and visible growths are absent. The humidity of coverlet is common. The turgor is saved. The elasticity is slightly lowered due to age-specific change. Visible mucous are faintly-pink, without rash.

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[2] All data in the exracts are fictitious. Any coincidences with real persons are accident.

Blood circulation system. The pulse is symmetric, rhythmical, 68 beats per minute, of normal tension and filling. Pathologic pulsation of neck arteries and veins is not observed. The arteries and veins are dense at palpation.

Blood pressure: 140/80.

Soft heart sounds, regular rhythm. Beat rate is 68 beats per minute.

The breathing is easy, through the nose. Breathing type is mixed. The thorax's motion at breathing is regular. A respiration rate is 20. All over the lungs' surface the breathing is hard. Secondary breathing noise is absent.

The mouth angle is symmetric, lips colour is pink, labial fissures are absent. Mucosa is faintly-pink, gums are not changed. The tongue is not fur, regular coloured. The abdomen is soft. Shetkin-Blumberg symptom is negative.

The liver is soft, smooth, painless, upper cut.

The urination system. The urinary bladder is painless, of regular size. Urination is painless, 8 times per day, 1 time during night, the urine is straw-coloured, the quantity is 1.5-2 L. Edemata are absent.

*Data of laboratory and instrumental tests:*

**1.1.** (Test no. 1.) Blood analysis (norm).

*Day 1* of hospitalization: Erythrocytes – 3.30 (3.4-5.0) mln/ μL, Haemoglobin – 95 (120-160) g/l, Colour index – 0.8 (0.85-1.05), Leukocytes – 9.0×109 (3.2-10.2)/l, Eosinophils – 3% (0.5-5), Bands neutrophils – 7% (1-6), Segmentated neutrophils – 62% (47-72), Lymphocytes – 18% (19-37), Monocytes – 10% (3-11), ESR – 15 (2-20) mm/h.

*Day 3* of hospitalization:  Erythrocytes – 3.50 (3.4-5.0) mln/ μL, Haemoglobin –100 (120-160) g/l, Colour index – 0.8 (0.85-1.05), Leukocytes – 9.0×109 (3.2-10.2)/l, Eosinophils – 2% (0.5-5), Bands neutrophils – 7% (1-6), Segmentated neutrophils –  61% (47-72), Lymphocytes – 18% (19-37), Monocytes – 12% (3-11), ESR – 15 (2-20) mm/h.

*Day 5* of hospitalization: Erythrocytes – 3.50 (3.4-5.0) mln/ μL, Haemoglobin –105 (120-160) g/l, Colour index – 0.9 (0.85-1.05), Leukocytes – 9.0×109 (3.2-10.2)/l, Eosinophils – 1% (0.5-5), Bands neutrophils – 8% (1-6),

Segmentated neutrophils –  60% (47-72), Lymphocytes – 19% (19-37), Monocytes – 12% (3-11), ESR – 15 (2-20) mm/h.

*Day 6* of hospitalization:  Erythrocytes – 4.00 (3.4-5.0) mln/ μL, Haemoglobin –110 (120-160) g/l, Colour index – 0.9 (0.85-1.05), Leukocytes – 9.0×109 (3.2-10.2)/l,  Eosinophils – 1% (0.5-5), Bands neutrophils –  8% (1-6), Segmentated neutrophils –  59% (47-72), Lymphocytes – 20% (19-37), Monocytes – 12% (3-11), ESR – 15 (2-20) mm/h.

*Day 7* of hospitalization:  Erythrocytes – 4.38 (3.4-5.0) mln/ μL, Haemoglobin –110 (120-160) g/l, Colour index – 0.9 (0.85-1.05), Leukocytes – 9.0×109 (3.2-10.2)/l, Eosinophils – 1% (0.5-5), Bands neutrophils –  8% (1-6), Segmentated neutrophils –  61% (47-72), Lymphocytes – 19% (19-37), Monocytes – 11% (3-11), ESR – 10 (2-20) mm/h.

**1.2.** (Test no. 2.) Urine analysis (norm): Unit weight – 0.019 (1.008 – 1.024), Transparency – transparent (transparent), Colour – light-yellow (straw-coloured), Protein – 1.020 (0.025–0.070), Leukocytes –1–2 in visual field (1–2 in visual field), Erythrocytes – singles (singles), Epithelium  – 0–3 in visual field (0–3 in visual field), Salt–oxalate crystals.

**1.3**. (Test no. 3.) Chemical blood analysis (norm):

*Day 1*: Glucose – 4.4 (3.4-5.6) mmol/L, whole bilirubin – 10 (20.5) μmol/L, Conjugated bilirubin – 3.3 (0.86-4.3) μmol/L, ALT – 0.6 (0.1-0.68) mmol/L, AST – 0.4 (0.1-0.45) mmol/L, Whole cholesterol – 480 (160-330) mmol/L.

*Day 5*: Glucose – 4.4 (3.4-5.6) mmol/L, whole bilirubin – 9.8 (20.5) μmol/L, Conjugated bilirubin – 3.2 (0.86-4.3) μmol/L, ALT – 0.61 (0.1- 0.68) mmol/L, AST – 0.43 (0.1-0.45) mmol/L, Whole cholesterol – 390 (160-330) mmol/L.

*Day 7*: Glucose – 4.3 (3.4-5.6) mmol/L, whole bilirubin – 10.1 (20.5) μmol/L, Conjugated bilirubin – 3.1 (0.86-4.3) μmol/L, ALT – 0.63 (0.1-0.68) mmol/L, AST – 0.42 (0.1-0.45) mmol/L, Whole cholesterol – 200 (160-330) mmol/L.

**2. State Clinical Hospital. Cardiological Department.**

Patient Sidorov I.A.

Card no. 2342, Room number –20. Ward no. 5.

Age: 52

Sex: male

Address: Rostov, Engels str., 12

Admission date: 12.01.1999

Discharge date: 28.01.1999

Referral diagnosis: cirrhosis, insular diabetes of II type

Clinical diagnosis: insular diabetes, exacerbation

Complication: splenomegaly, hepatomegaly, portal hypertension

Coexistent disease: cholelithiasis, chronic calculous cholecystitis.

General inspection.

General condition: moderate severity. Consciousness: clear. Temperature: 36,6∘C. Blood pressure: 140/90.

Constitution is hypersthenic. Derma: faintly-yellow coloured, dry, the turgor is lowered. The hypodermic cellular tissue is over standing, irregalurly spread, no visible edemata.

Oculus' mucosa is pink, wet and clean. Some sclera's subectericity is observed. Mucosa of cheeks, soft and nard palate, pharynx back wall and palate's arch is pink-coloured, wet and clean. Tonsils don't exceed the bounds of palate's arch. Gums are not changed. The tongue is of regular size, wet, covered with white incrustation, lingual papilla are smoothed.

The breathing is easy, rhythmic, and superficial, through the nose. Respiratory rate is 18. The breathing is vesicular. Secondary sounds are not determined.

Heart's tones are clear, rhythmic. The pulse is symmetric, rhythmical, regular, 98 beats per minute.

The abdomen is oversized, engaged in the breathing, umbilicus is not pulled into. The abdomen is painful. Bad painfulness is observed to right side

in the spleen area, to the left at the age of rib arch. Easy liquid in the abdominal cavity is detected.

The liver exceeds the bounds of the rib arch on 3 cm. The liver's edge is rounded, of dense consistence, the surface is small-tuberous and painful.

The urination is not affected. Visible changes are not observed in the loin area. The kidneys are not palpated. Percussion symptom in the loin area is negative. The, urine is faintly-yellow coloured, transparent, unit weight is 1012, protein is negative.

*Data of laboratory and instrumental tests:*

**2.1.** (Test no. 1). Chemical blood analysis (norm):

*Day 1*: Whole bilirubin – 13.3% (8.6-20.5), whole protein – 72.0 hl (65-85); glucose – 8.6 mmol/L (3.5-5.7); AsT – 1.0 mmol/(h·L) (0.1-0.45); AlT – 2.0 mmol/(h·L) (0.1-0.45); β – amylase serum – 84 hh·L (less than 220); blood urea – 2.6 mmol/L (2.5-8.3); creatinine – 88 mmol/L (53-97).

*Day 2*: Whole bilirubin – 13.2% (8.6-20.5), whole protein – 72.0 hl (65-85); glucose – 8.6 mmol/L (3.5-5.7); AsT – 1.0 mmol/(h·L) (0.1-0.45); AlT – 2.0 mmol/(h·L) (0.1-0.45); β – amylase serum – 84 hh·L (less than 220); blood urea – 2.6 mmol/L (2.5-8.3); creatinine – 88 mmol/L (53-97).

*Day 7*: Whole bilirubin – 13.4% (8.6-20.5), whole protein – 73.5 hl (65-85); glucose – 6.3 mmol/L (3.5-5.7); AsT – 0.7 mmol/(h·L) (0.1-0.45); AlT – 1.2 mmol/(h·L) (0.1-0.45); β – amylase serum – 82 hh·L (less than 220); blood urea – 2.7 mmol/L (2.5-8.3); creatinine – 88.2 mmol/L (53-97).

**2.2.** (Test no 2). Blood analysis (norm):

At the day 1 of hospitalization: Hb – 100 g/l (130-175); erythrocytes – $4.84 \times 1012$ /L (4-5.6); colour index – 0.9 (0.85-1.05); Leukocytes – $4.0 \times 109$ /L (4.3-11.3); ESR – 10 mm/h (1-14); bands – 1% (1-6); segmentated – 65% (47-72); Eosinophils – 2% (0.5-5); Lymphocytes – 22 %(19-37); Monocytes – 10% (3-11).

Test no. 3. Glucose-urine profile

Hours     Quantity          Weight          Glucose

| 8-13 | 100 | 1015 | neg. |
| 13-18 | 200 | 1010 | 3% |
| 18-22 | 120 | 1018 | 1% |
| 22-2 | 200 | 1006 | neg. |
| 2-9 | 200 | 1006 | neg. |

Test no. 4. Glycemic profile

| Hours | Index |
| 8 | 9.6 |
| 13 | 10.5 |
| 18 | 13.2 |
| 22 | 8.7 |
| 6 | 10.8 |

### 3. Moscow Clinical Hospital. Department – Surgical.

Patient Mikhailov A.N.

Card no. 3716, Room number – 22. Ward no. 1.

Age: 20

Sex: male

Address: Novgorod, Rostovskaya str., 6

Admission date: 08.03.2001

Discharge date: 15.03.2001

Referral diagnosis: acute appendicitis

Clinical diagnosis: acute phlegmonic appendicitis

Complication: typhlitis, terminal ileitis

Coexistent disease: gastritis, consequences of craniocelebral trauma

General inspection.

Condition is of moderate severity. Consciousness is saved. Temperature is 38,20C.

The constitution is regular. Bearing is regular. The body's half parts are symmetric. Deformation of the thorax is absent. Scapulas' angles are straight downwards.

The breathing is vesicular, is listened well in the lower parts. There are no rales. Breathing type is mixed. Breathing is deep, rhythmic. Thorax's movement at breathing is homogeneous. Respiratory rate is 18 per min.

Heart's tones are muted, rhythmic. HR is 72. BP is 120/80 mm Hg.

Coverlet is pale. There are no obvious cyanosis, icteritiousness and parts of pathologic pigmentation. Humidity, turgor and skin elasticity corresponds to the norm. There are no rash, scars, scraths and visible growths.

Visible mucous are clear and pink-coloured. The tongue is wet, pink-coloured, of regular form and size, without rash. The abdomen isn't oversized, strained, painfulness at palpation (especially at right iliac cavity), right side is fall of the left one at breathing. Shetkin-Blumberg symptom is positive. Rovsing symptom is positive. Sitkovskii symptom is positive. Krymov's symptom is negative.

The liver is soft, smooth, and painless, at palpation, upper cut. Upper cut is placed at the edge of rib arch.

There are no complaints on urinary excretion. There are no edemata and disorder of urination. Urination isn't strangury. Urine colour is yellow. There are no blood admixtures in the urine. There is no pain in the lumbar area.

The delivered diagnosis is the absolute indication for operation.

Operation (08.03.01): appendectomy, inspection of abdominal cavity.

Surgeon – Berezkin I. G.; assistant – Ilyin G.M. Operating nurse – Ivanova A.V., anaesthetist – Semenov Y.V.

Anesthetization type – combined incubatory narcosis

*Data of laboratory and instrumental tests:*

**3.1.** (Test no. 1). Blood analysis (norm):

*8.03.01:* leukocytes – 21.4×109 /L (4.3-11.3); erythrocytes – 4.3 mln/μL (4-5.6); Hb – 145 g/L (130-175); colour index – 1.01 (0.85-1.05); eosinophils - 2% (0.5-5%); bands neutrophils – 7% (1-6%), segmentated – 60% (47-72%); lymphocytes – 21% (19-37%); monocytes – 10% (3-11%); ESR – 55 mm/h (1-14).

*09.03.01:* leukocytes – 17.4×109 /L (4.3-11.3); erythrocytes – 4.38 mln/μL (4-5.6); Hb – 147 g/L (130-175); colour index – 1.0 (0.85-1.05); eosinophils - 1% (0.5-5%); bands neutrophils – 8% (1-6%), segmented – 61% (47-72%); lymphocytes – 19% (19-37%); monocytes – 11% (3-11%); ESR – 45 mm/h (1-14).

*13.03.01:* leukocytes – 11.4×109 /L (4.3-11.3); erythrocytes – 4.32 mln/μL (4-5.6); Hb – 146 g/L (130-175); colour index – 0.95 (0.85-1.05); eosinophils - 1% (0.5-5%); bands neutrophils – 9% (1-6%), segmented – 59% (47-72%); lymphocytes – 20% (19-37%); monocytes – 11% (3-11%); ESR – 25 mm/h (1-14).

**3.2.** (Test no. 2). Urine analysis (norm):

*8.03.01*: colour - yellow (straw-coloured); muddy (transparent); Sg – 1.021 (1.008-1.024); reaction – acid; protein – neg. (0.025-0.070); leukocytes – 2-3 in visual field (1-2 in visual field); erythrocytes – neg. (singles); epithelium– 1-2 in visual field (0-3 in visual field).

*9.03.01*: colour - yellow (straw-coloured); muddy (transparent); Sg – 1.020 (1.008-1.024); reaction – acid; protein – 0.066%. (0.025-0.070); leukocytes – 1-2 in visual field (1-2 in visual field); erythrocytes – 0-1. (singles); epithelium – 1-2 in visual field (0-3 in visual field).

*13.03.01*: colour - yellow (straw-coloured); transparent (transparent); Sg– 1.015 (1.008-1.024); reaction – acid; protein – 0.056%. (0.025-0.070); leukocytes – 0-1 in visual field (1-2 in visual field); erythrocytes – 0-1. (singles); epithelium – 0-1 in visual field (0-3 in visual field).

**3.3.** (Test no. 3). *Changing of parameters of objective inspection:*

*8.03.01*: Temperature +38.2oC. HR 82 /min. BP 130/80 mm Hg.

*12.03.01*: Temperature +37.3oC. BP 123/78 mm Hg, HR 70 /min.

*13.03.01*: Temperature +37.1oC. BP 118/84 mm Hg, HR 68 /min.

*14.03.01*: Temperature +36.8oC. BP 120/80 mm Hg. HR 71 /min.

*15.03.01*: Temperature +36.6oC. BP 110/70 mm Hg. HR 72 /min.

**4. Moscow Clinical Hospital no.1. Department – maxillofacial surgery.**

Patient Samoilov V.R.

Card no. 2106, Room number – 6. Ward no. 3.

Age: 3

Sex: male

Address: Kursk, Hutorskaya str., 35

Admission date: 04.09.2003

Discharge date: 11.09.2003

Referral diagnosis: lymphangioma of right half of face and neck.

Clinical diagnosis: cystic-cavernous lymphangioma of mouth cavity bottom and parotid masticatory area in the right

Complication: none

Coexistent disease: none

General inspection.

General condition is satisfactory. Position is active, consciousness is clear. The constitution is regular, of satisfactory feeding.

Coverlets are clean, moderately wet. Skin at the lump isn't changed, folded easily. Hypodermic adipose tissue is gently developed.

Peripheral lymph nodes are without change. Regional lymph nodes are painful at palpation, mobile, are not enlarged, of soft and elastic consistence.

Oral cavity: there are bubbly incrustations at the mucous of mouth cavity bottom and at the tongue's tip. Mouth cavity bottom is raised a little, especially at the left.

Heart boarders are in the norm, heart tones are clear, rhythmic. Pulse is 90 per min, rhythmic, of satisfaction filling, BP 60/45 mm Hg.

The breathing is nasal, easy, symmetric parts of the thorax are engaged in breathing equally, breathing type is mixed, vesicular, without rales.

The abdomen is soft, painless.

The liver and spleen are not palpated.

Operation (part 2). Excision of lymphangioma in submandibular mouth and neck area.

Anesthetization type – mask. Main narcosis – combined.

Incision in the submandibular area has been conducted. Multicompartment abscess has been revealed. Abscess's cavities are filled with transparent liquid. The abscess has been partly removed. Haemostasis has been conducted during operation. The wound has been kneed by vikril. Proline was applied on to the skin. Two drainages have been left in the wound. Aseptic bandage has been applied.

*Data of laboratory and instrumental tests:*

**4.1.** (Test no. 1). Urine analysis (norm):

*Day 1*. protein – neg.  (neg.), reaction – acid (acid); weight – 1017 (1010-1020); transparency – muddy (transparent); glucose – absent (neg.); blennuria – a little (absent); leukocytes – 1-2 in visual field (1-2 in visual field); epithelium– singles in visual field (absent).

*Day 3*. protein – neg.  (neg.), reaction – acid (acid); weight – 1015 (1010-1020); transparency – transparent (transparent); glucose – absent (neg.); blennuria – a little (absent); leukocytes – 0-1 in visual field (1-2 in visual field); epithelium – singles in visual field (absent).

*Day 7*. protein – neg.  (neg.), reaction – acid (acid); weight – 1015 (1010-1020); transparency – transparent (transparent); glucose – absent (neg.); blennuria – neg. (absent); leukocytes – 0-1 in visual field (1-2 in visual field); epithelium – singles in visual field (absent).

**4.2.** (Test no. 2). Blood analysis (norm):

*Day 1*: Hb – 120 g/L (110-140); erythrocytes – 4.5 mln/µL (3.4-5.0); leukocytes – $6.9×10^9$ /L (3.2-6.0); neutrophils: bands – 2% (1-6%), segmentated – 73% (50-65%); eosinophils – 3% (0.5-5%); lymphocytes – 16% (19-40%); monocytes – 6% (3-11%); ESR – 25 mm/h (2-20).

*Day 3*: Hb – 123 g/L (110-140 g/L); erythrocytes – 4.6 mln/µL (3.4-5.0); leukocytes – $6.1×10^9$ /L (3.2-6.0); neutrophils: bands – 3% (1-6%),

segmentated – 74% (50-65%); eosinophils – 2% (0.5-5%); lymphocytes – 17% (19-40%); monocytes – 4% (3-11%); ESR – 15 mm/h (2-20).

*Day 7*: Hb – 121 g/L (110-140); erythrocytes – 4.4 mln/μL (3.4-5.0); leukocytes – 5.1×109 /L (3.2-6.0); neutrophils: bands – 4% (1-6%), segmentated – 72% (50-65%); eosinophils – 1% (0.5- 5%); lymphocytes – 18% (19-40%); monocytes – 5% (3-11%); ESR – 10 mm/h (2-20).

**5. Moscow Clinical Hospital no.1. Department – gastroenterological.**

Patient Maskova A.S.

Card number – 4402. Room number – 13. Ward – 7.

Age: 75 years

Sex: female

Address: Moscow, Khutorskaya str., 35

Admission date: 03.02.1997

Discharge date: 21.02.1997

Referral diagnosis: pancreatitis.

Clinical diagnosis: exacerbation crhonical pancreatitis.

Complications no

Coexisting diseases: ischemic heart disease, stenocardia of stress.

General inspection.

Patient's condition is satisfactory. State is active. Constitution is regular, no skeleton deformations. Height 167 cm, weight 62 kg. Hypodermic fatty tissue moderately expressed. Coverlets are of common colour, clean. Skin turgor is saved, skin is dry, and elasticity is partially lowered. Ungual plates are not changed. Visible mucous are of pale-pink colour.

Bony-muscular system. General development of a muscular system is good, isn't painfulness at muscles' palpation. Deformations of bones, painfulness at joints' palpation are absent. Joints are of usual configuration.

Lymph nodes are not palpated.

The Thyroid gland is not enlarged, of soft elastic consistence. Symptoms of thyrotoxicosis are absent.

The Circulatory system. The pulse is 80 beats per min, rhythmical, non-stressed, of satisfactory filling. The same on both hands. Heart tones are clear, weakened at the top, rhythmic and of satisfactory characteristics.

The Respiratory system. The thorax is of regular form; both halves are homogeneously involved in breathing. Breathing is rhythmic of small depths. Respiratory rate is 20 per min.

The Gastrointestinal tract. Inspection of the mouth cavity: the tongue is wet, is imposed by whitish incrustation. Gums are pink, are not bleed, without the inflammatory phenomena. Gullet mucous is damp, pink, and pure. The abdomen is symmetric from both sides; the abdominal wall participates in breathing. At superficial palpation the abdominal wall is soft, painless, not strained. At deep palpation in left iliac areas the sigmoid gut is defined, which is painless, smooth, of dense elastic consistence. Blind gut and colon guts are not palpated. The is a painfulness of average intensity in the epigastric.

THE LIVER and GALL BLADDER. The bottom edge of a liver does not leave from under a costal arch. The gall bladder is not palpated. Ortner's symptom is negative. Phrenicus symptom is negative.

THE URINOGENITAL SYSTEM. Kidneys and projection area of ureters are not palpated; beating on lumbar area is painless. Mayo-Robson symptom is positive.

*Data of laboratory and instrumental tests:*

**5.1.** (Test no. 1). Blood analysis:

*Day 1*: Hb – 132 g/L (120-160); erythrocytes – 4.25 mln/μL (3.4-5.0); colour index – 0.94 (0.85-1.05); leukocytes – 15.0×109 /L (3.2-10.2); eosino-phils - 1% (0.5- 5%); neutrophils: bands – 8% (1-6%), segmentated – 46% (47-72%); lymphocytes – 42% (19-37%); monocytes – 3% (3-11%); ESR– 25 mm/h(2-20).

*Day 3*: Hb – 133 g/L (120-160); erythrocytes – 4,20 mln/μL (3,4-5,0); colour index – 0.92 (0.85-1.05); leukocytes – 11.0×109 /L (3.2-10.2); eosino-phils - 3% (0.5- 5%); neutrophils: bands – 9% (1-6%), segmentated – 45% (47-

72%); lymphocytes – 41% (19-37%); monocytes – 2% (3-11%); ESR– 21 mm/h(2-20).

*Day 7*: Hb – 135 g/L (120-160); erythrocytes – 4.23 mln/μL (3.4-5.0); colour index – 0.95 (0.85-1.05); leukocytes – 9.0×109 /L (3.2-10.2); eosinophils - 1% (0.5- 5%); neutrophils: bands – 6% (1-6%), segmentated – 47% (42-72%); lymphocytes – 43% (19-37%); monocytes – 3% (3-11%); ESR– 15 mm/h(2-20).

**5.2.** (Test no. 2).

*Day 1*. Urine analysis (norm): colour - pale-yellow (straw-coloured); reaction acid; weight 1.018 (1.008-1.024); protein – 0.065 (0.025-0.070); glucose– 8.3 (no); leukocytes 2-4 in visual field (1-2 in visual field); epithelium– 2-4 in visual field (0-3 in visual field).

*Day 3*. Urine analysis (norm): colour - pale-yellow (straw-coloured); reaction acid; weight 1.015 (1.008-1.024); protein – 0.050 (0.025-0.070); glucose – 3.3 (no); leukocytes 2-3 in visual field (1-2 in visual field); epithelium – 1-2 in visual field (0-3 in visual field).

*Day 7*. Urine analysis (norm): colour - pale-yellow (straw-coloured); reaction acid; weight 1.015 (1.008-1.024); protein – 0,020 (0.025-0.070); glucose – 2.5 (no); leukocytes 1-2 in visual field (1-2 in visual field); epithelium – 0-1 in visual field (0-3 in visual field).

**5.3.** (no. 3). *Patient's medical history:*

*3.02.97*. t 38.3oC in the evening, in the morning 37.8 oC.

BP 135\80 mm Hg, HR 80 beats/min.

*4.02.97*. t 38.1oC in the evening, 37,9oC in the morning.

BP 130\90 mm Hg, HR 87 beats/min.

*6.02.97*. t 37.8oC in the evening, 36,9oC in the morning.

BP 120\90 mm Hg, HR 90 beats/min.

*7.02.97*. t 37.8oC in the evening, 36,5oC in the morning.

BP 120\90 mm Hg, HR 90 beats/min.

*8.02.97*. t 37.4oC in the evening, 36.8oC in the morning.

BP 120\80 mm Hg, HR 80 beats/min.

*10.02.97.* t 37.1oC in the evening, 36.2oC in the morning.

BP 120\90 mm Hg, HR 87 beats/min.

*11.02.97.* t 37.3oC in the evening, 36.8oC in the morning.

BP 120\ 80 mm Hg, HR 80 beats/min.

**6. State Clinical Hospital no. 31. Surgery Department.**

Patient Vaile's N.P.

Card number – 485. Room number – 24. Ward – 2.

Age: 43 years

Sex: male

Address: Omsk, Naberezhaya str., 17

Admission date: 15.10.2004

Discharge date: 10.11.2004

Referral diagnosis: ulcerous disease of stomach and duodenal gut

Clinical diagnosis: ulcerous disease of stomach and duodenal gut in acute condition.

Complications: pyloroduodenal stenosis.

Coexisting diseases: no.

General inspection.

Condition of the patient of mean severity, position active, consciousness clear. The constitution is normosthenic. At derma coverlet inspection the skin is pale, of norm humidity, warm to the touch, the turgor it is lowered.

At inspection visible mucous membranes are pink, haemorrhages, ulceration and crusts are absent.

Mandibular, cervical, supraclavicular, subclavicula, axillary, inguinal lymph nodes are not palpated. The nourishment is lowered, hypodermically-fatty tissue is developed poorly. The thyroid gland is not increased, lymph nodes are not palpated.

Breath is through a nose, free; pathological branches from the top respiratory ways are absent. The thorax is of normosthenic forms, both halves

of the thorax symmetrically participate in the breathing. Breath is of moderate depth, rhythmical, respiratory rate is 18 per 1 minute.

Dyspnoea and edemata are absent. A condition of veins and arteries is without pathological features. Bulging of veins and arteries is absent. Borders of heart are within norm. At auscultation heart's tones are clear and rhythmical, pathological noise it is not revealed. Pulse on beam arteries is b. in a minute, rhythmical and of good filling. Blood pressure is 140/60 mm Hg on both hands at the moment of survey.

Infringements urination is absent. Quantity of urine is usual. At survey of the lumbar's area swelling and reddening are not revealed. Painfulness in the kidneys' area and on a course of ureters is absent.

The tongue is wet and imposed by white incrustation. The abdomen is of normal configuration, symmetric, participates in the breathing. At percussion a tympanic sound of various shades is defined over the all surface of a abdomen.

At palpation the abdomen soft, painful in the epigastria area. Divergences of direct muscles of the abdomen and irritation symptoms of peritoneum are not revealed.

Now the patient is continuing the course of treatment and going through a preoperative preparation.

*Data of laboratory and instrumental tests:*

**6.1.** (Test no. 1.)

*Day 1.* Blood analysis: Hb – 95 g/L (130-175); leukocytes – 9.5×109 /L (4.3-11.3); erythrocytes – 3.38 mln/µL (4.0-5.6); colour index – 0.7 (0.85-1.05); neutrophils: bands – 2% (1-6%), segmentated – 65% (47-72%); eosinophils - 2% (0.5- 5%); lymphocytes – 19% (19-37%); monocytes – 10% (3-11%); ESR – 4.3 mm/h(1-14).

*Day 3.* Blood analysis: Hb – 100 g/L (130-175); leukocytes – 7.5×109 /L (4.3-11.3); erythrocytes – 4.10 mln/µL (4.0-5.6); colour index – 0.8 (0.85-1.05); neutrophils: bands – 1% (1-6%), segmentated – 66% (47-72%);

eosinophils - 1% (0.5- 5%); lymphocytes – 19% (19-37%); monocytes – 10% (3-11%); ESR – 4.3 mm/h(1-14).

*Day 7.* Blood analysis: Hb – 105 g/L (130-175); leukocytes – 6.5×109 /L (4.3-11.3); erythrocytes – 5.10 mln/μL (4.0-5.6); colour index – 0.9 (0.85-1.05); neutrophils: bands – 3% (1-6%), segmentated – 64% (47-72%); eosinophils - 2% (0.5- 5%); lymphocytes – 20% (19-37%); monocytes – 9% (3-11%); ESR – 4.4 mm/h(1-14).

**6.2.** (Test no. 2). Chemical blood analysis (norm):

*Day 1.* Chemical blood analysis (norm): bilirubin total– 13.3% (8.6-20.5); total protein – 72 g/L (65-85); glucose fasting 6.7 mmol/L (3.5-5.7); AsT– 35 mmol/(h·L) (0.1-0.45); AlT – 21 mmol/(h·L) (0.1-0.68); serum β - amylase– 82 hh·L (under 220); urea – 2.8 mmol/L (2.5-8.3); creatinine – 88.4 mmol/L (53-97).

*Day 3.* Chemical blood analysis (norm): Bilirubin total– 13.0% (8.6-20.5); total protein – 72.3 g/L (65-85); glucose fasting – 5.7 mmol/L (3.5-5.7); AsT – 20 mmol/(h·L) (0.1-0.45); AlT – 16 mmol/( h·L) (0.1-0.68); serum β - amylase– 80 hh· L (under 220); urea – 2.6 mmol/L (2.5-8.3); creatinine – 88 mmol/L (53-97).

*Day 7.* Chemical blood analysis (norm): Bilirubin total– 13.1% (8.6-20.5); total protein – 72.5 g/L (65-85); glucose fasting – 5.1 mmol/L (3.5-5.7); AsT – 10 mmol/(h·L) (0.1-0.45); AlT – 5 mmol/( h·L) (0.1-0.68); serum β - amylase– 84 hh·L (under 220); urea – 2.5 mmol/L (2.5-8.3); creatinine – 88.1 mmol/L (53-97).

**6.3.** (no. 3). *Changing of parameters of objective inspection:*

*15.10.2004.* T – 36.6oC. Ps – 82 beats/min. BP – 130/85. RR – 16.

*18.10.2004.* T – 36.8oC. Ps – 80 beats/min. BP – 120/70. RR – 15.

*21.10.2004.* T – 36.6oC. Ps – 76 beats/min. BP – 140/80. RR – 17.

*23.10.2004.* T – 36.4oC. Ps – 78 beats/min. BP – 138/75. RR – 18.

*26.10.2004.* T – 36.7oC. Ps – 81 beats/min. BP – 130/70. RR – 16.

**7. State Clinical Hospital no. 31. Department of Pulmonology.**

Patient Stepanov A.A.

Card number – 2004. Room number – 17. Ward – 21.

Age: 23 years

Sex: male

Address: Ulyunovka, 29

Admission date: 07.12.2001

Discharge date: 28.12.2001

Referral diagnosis: fibrous - cavernous tuberculosis

Clinical diagnosis: Infiltrating tuberculosis of top part of the right lung in disintegration phase

Complications: no.

Coexisting diseases: glucose diabetes, serious form.

General inspection.

General patient's condition is satisfactory. The constitution is normosthenic. Derma coverlets are of normal humidity and elasticity, with a greyish shade, visible mucous are pink, without nidus changes. Peripheral nodes are not increased, palpation of them is painless. The locomotive system is without peculiarities.

The voice is not changed; breath through a nose is complicated because of a chronic rhinitis. A thorax is normosthenic, without deformations, symmetric. Both halves actively participate in breathing, the auxiliary muscles do not participate in the breathing. Super- and subclavicular fosses are moderately expressed. Resparatory rate is 18 in a minute, a dyspnea at the moment of survey in absent.

Vocal trembling is not changed. At comparative percussion a pulmonary a sound is defined over the lungs, on the right in front on is middle-clavicular lines from a the clavicle to the 2 area between ribs the dullness of the percussion sound a sound is defined. At auscultation over the larger surface of the lungs a vesicular breath is defined, over the area a dullness of the percussion

sound there are small-calibre rales against rigid breath, which are not changing at tussiculation and change position of a body of the patient.

The hurt push is defined in the fifth area between ribs on the middle-clavicular line. At auscultation tones of heart are pure, without pathological noise. BP – 110/60, pulse – 76 in a minute, rhythmical, of satisfactory pressure and good filling.

Appetite is good, the swallowing is not broken, dyspeptic disorders are absent. Mucous of the oral cavities is pink, the tongue is without incrustation. The abdomen is of the usual form, participates in the breathing, soft and painless at superficial palpation. At deep palpation parts of the intestines are without peculiarities.

The liver go beyond a costal arch by 1 cm, its edge is rough and sensitive at palpation. Urination is not disordered, quantity of urine against the insulin therapy is normal. Kidneys are not palpated, Pasternatsky symptom is negative in both sides.

The patient comes into contact and benevolent. Mood is lowered, the sleep is not broken.

*Data of laboratory and instrumental tests:*

**7.1.** (Test no. 1.)

Blood analysis (norm) at 7.12.01.: erythrocytes – $4.4 \times 1012$ /L (4.0-5.6); Hb – 147 g/L (130-175); colour index – 1.0 (0.85-1.05); leukocytes – $7.2 \times 109$ /L (4.3-11.3); eosinophils – 1% (0.5-5%); neutrophils: bands – 4% (1-6%); segmented – 56% (47-72%); lymphocytes – 37% (19-37%); monocytes – 2% (3-11%); ESR – 30 mm/h(1-14).

Blood analysis (norm) at 15.12.01: erythrocytes – $4.5 \times 1012$ /L (4.0-5.6); Hb - 142 g/L (130-175); colour index – 0.9 (0.85-1.05); leukocytes – $7.3 \times 109$ /L(4.3-11.3); eosinophils – 2% (0.5-5%); neutrophils: bands – 6% (1-6%); segmented – 67% (47-72%); lymphocytes – 20% (19-37%); monocytes – 5% (3-11%); ESR – 10 mm/h(1-14).

**7.2.** (Test no. 2.)

Definition of glucose content in blood (norm) at 07.12.01:

glucose – 8.6 mmol/L (3.3-6.6 mmol/L).

Definition of glucose content in blood (norm) at 15.12.01:

glucose – 7.6 mmol/L (3.3-6.6 mmol/L).

Definition of glucose content in blood (norm) at 17.12.01:

glucose – 6.9 mmol/L (3.3-6.6 mmol/L).

**7.3.** (Test no. 3).

Urine analysis (norm) at 07.12.01.: weight – 1.033 (1.008-1.024); colour– pale-yellow (straw-coloured); protein – neg. (0.025-0.070); leukocytes – 1-2 in visual field (1-2 in visual field); epithelium – neg. (0-3 in visual field); salt –oxalate; blennuria - neg.; reaction – acid; glucose-1.6% (under 0.02%)

Urine analysis (norm) at 14.12.01 г.: weight – 1.036 (1.008-1.024); colour – pale-yellow (straw-coloured); protein – 0.06 g/L (0.025-0.070); leukocytes – 10-20 in visual field (1-2 in visual field); epithelium – neg. (0-3 in visual field); salt – neg.; blennuria – moderate; reaction – acid; glucose-0.9% (under 0.02%)

Urine analysis (norm) at 17.12.01 г.: weight – 1.030 (1.008-1.024); colour – pale-yellow (straw-coloured); protein – 0.056 g/L (0.025-0.070); leukocytes – 10-20 in visual field (1-2 in visual field); epithelium – neg. (0-3 in visual field); salt – neg.; blennuria – moderate; reaction – acid; glucose-0.9%( under 0.02%)

**8. State Clinical Hospital no. 31. Department of Pulmonology.**

Patient Ivanova O.A.

Card number – 2325. Room number – 33. Ward – 26.

Age: 12 years

Sex: female

Address: Ockakovo, Matrosov str., 15.

Admission date: 25.03.03.

Discharge date: 09.04.03.

Referral diagnosis: Acute community-acquired nidal low-lobe pneumonia on the left

Clinical diagnosis: Acute community-acquired uncomplicated nidal low-lobe pneumonia on the left.

Complications: no.

Coexisting diseases: catarrhal quinsy, double-sided tonsillitis, cholecystitis.

General inspection.

Temperature – 39.0°C. Consciousness is clear, condition is heavy. Appearance corresponds to age.

The skin IS of physiological colouring, moderate humidity and elasticity.

Mouth mucous are pink, damp. The tongue is covered by white incrustations. A pharynx is red. Tonsils are flushed, moderately go beyond the edges of archs.

The hypodermically-fatty layer is expressed moderately, evenly distributed. Turgor of soft tssues and the muscular tone is kept.

Lymph nodes are not increased.

The thorax is asymmetrical due to insignificant right-hand scoliosis in chest area. Complains of an acute pain in the field of 6th, 7th ribs at the left on middle-axillary lines, arising at cough and deep breath. Pinfulness is in a projection of the painful centre.

Breath is rigid and visicular. Vocal trembling is strengthened in the field of a projection of the pathological centre. At percussion there is a damping of a sound in points over the pathological centre. The crepitation is listened in the area of 5-8 ribs on axillary lines.

Tachycardia obtains 94 beats/min. Blood pressure – 90/60 mm Hg.

*Data of laboratory and instrumental tests:*

**8.1.** (Test no. 1).

Blood analysis *26.03.03*: erythrocytes – $3.7 \times 10^{12}$ /L (3.4-5.0); Hb – 114 g/L (120-160); ESR – 55 mm/h(2-20); leukocytes – $16.6 \times 10^9$ /L (3.2-10.2)

basophils – 0% (0-1), eosinophils – 2% (0.5-5); neutrophils: bands – 4% (1-6); segmentated – 54% (47-72); lymphocytes – 40% (19-37); monocytes – 5% (3-11); leuko-formulae shifts to the left.

Blood analysis *29.03.03*: Hb – 124 g/L (120-160); ESR – 45 mm/h (2-20); leukocytes – $14.0 \times 109$ /L (3.2-10.2) basophils – 1% (0-1), eosinophils – 5% (0.5-5); neutrophils: bands – 3% (3-11); segmentated – 43% (47-72); lymphocytes – 44% (19-37); monocytes – 5% (3-11); leuko-formulae shifts to the.

Blood analysis *07.04.03*: Hb – 121 g/L (120-160); ESR – 25 mm/h(2-20); leukocytes – $8.9 \times 109$ /L (3.2-10.2) basophils – 1% (0-1), eosinophils – 4% (0.5-5); neutrophils: bands – 4% (3-11); segmentated – 42% (47-72); lymphocytes – 45% (19-37); monocytes – 5% (3-11); leuko-formulae shifts to the left.

**8.2.** (Test no. 2).

Urine analysis (norm) *26.03.03*: weight – 1010 (1010-1020); leukocytes– 5-6 in visual field (1-2 in visual field); reaction – acid (acid); epithelium 1-2 in visual field (0-3 in visual field); color – straw-yellow (straw-colored); transparency – transparent (transparent); blennuria – considerable quantity.

Urine analysis (norm) *29.03.03*: weight – 1010 (1010-1020); leukocytes– 1-2 in visual field (1-2 in visual field); reaction – acid (acid); epithelium singles in visual field; color – straw-yellow (straw-colored); transparency – transparent (transparent); blennuria – considerable quantity.

Urine analysis (norm) *05.04.03*: weight – 1036 (1010-1020); color – pale-yellow (straw-colored); protein – neg. (0.025-0.070); leukocytes – 1-2 in visual field (1-2 in visual field); epithelium – neg. (0-3 in visual field); salt – neg.; blennuria – moderately; reaction – acid.

**9. State Clinical Hospitalno.31. Department of pulmonology.**

Patient Colin A.I.

Card number – 2305. Room number – 11. Ward – 14.

Age: 6 years

Sex: male

Address: Zheleznodorozhnii, Pionerskaya str., 10.

Admission date: 08.10.01

Discharge date: 28.10.01.

Referral diagnosis:

Clinical diagnosis: Hypererethism syndrome. An atopic bronchial asthma, in remission, men-severity current.

Complications: not revealed.

Coexisting diseases: Hypererethism syndrome, chronic rhinitis, atopic dermatitis.

General inspection.

Temperature-36.7oC. Pulse – 92 beats/min. RR – 16 /min. BP-80/55.

Complaints about dry cough, dizziness, weakness, indisposition.

At comparative percussion a tympanic shade percussion sound is observed, identical on symmetric sites.

At murmur research rigid breath is revealed, which is without rails, spent evenly in all departments of lungs. Tones of heart are sonorous and evenly.

Pulsation of neck and temporal vessels, arteries of extremity, and also epigastric arteries is not observed.

Appetite good. The tongue is damp, clear.

The liver is palpated on 3 cm below edge of a costal arch on right middle-clavicular line; a liver edge is dense, even, smooth, and painless.

*Results of laboratory tests.*

**9.1**. (Test no. 1). Blood analysis,  *08.10.01*: Hb – 110.9 g/L (110-140); leukocytes – 8.5×109 /L (3.2-6.0); erythrocytes – 3.38 mln/µL (3.4-5.0); colour index – 1.0 (0.85-1.05); neutrophils: bands – 2% (1-6%), segmented – 65% (50-65 %); eosinophils - 8% (0.5- 5%); lymphocytes – 19% (19-40%); monocytes – 10% (3-11%); ESR – 4.5 mm/h(2-20).

Blood analysis, *10.10.01*: Hb – 114.6 g/L (110-140); leukocytes – 9.5×109 /L (3.2-6.0); erythrocytes – 4.18 mln/µL (3.4-5.0); colour index – 1.0 (0.85-1.05); neutrophils: bands – 4% (1-6%), segmented – 62% (50-65%);

eosinophils - 5% (0.5-5%); lymphocytes – 20% (19-40%); monocytes – 9% (3-11%); ESR – 4.5 mm/h(2-20).

Blood analysis, *18.10.01*: Hb – 115.8 g/L (110-140); leukocytes – 9.3×109 /L (3.2-6.0); erythrocytes – 5.18 mln/μL (3.4-5.0); colour index – 1.0 (0.85-1.05); neutrophils: bands – 1% (1-6%), segmentated – 63% (50-65%); eosinophils - 7% (0.5-5%); lymphocytes – 22% (19-40%); monocytes – 7% (3-11%); ESR – 4.5 mm/h(2-20).

**9.2.** (Test no. 2). Chemical blood analysis (norm), *09.10.01*: whole protein – 68.8 p/L (65-85); albumens – 67%(56.6-66.8%); α- globulins – 4% (3-5.6%); urea – 4.4 mmol/L (2.4-8); whole bilirubin– 15.2 mmol/L (8.6-20.5); cholesterol – 3.8 mmol/L (2.6-5.2); potassium – 4.4 mmol/L (3.5-5.5); sodium– 145.2 mmol/L (132-155); calcium – 1.13 mmol/L (0.9-1.4).

Chemical blood analysis (norm), *12.10.01*: whole protein – 83.8 p/L (65-85); albumens – 57.4% (56.6-66.8%); α- globulins – 3.5% (3-5.6%); urea – 5.9 mmol/L (2.4-8); whole bilirubin – 20.0 mmol/L (8.6-20.5); cholesterol – 3.6 mmol/L (2.6-5.2); potassium – 4.9 mmol/L (3.5-5.5); sodium – 155.2 mmol/L (132-155); calcium – 1.3 mmol/L (0.9-1.4).

**9.3**. (Test no. 3).

Urine analysis (norm), *9.10.01*: Colour – yellow (straw-coloured); reaction – weak-acid (acid); weight – 1028 (1010-1020); epithelium: flat – insignificant quantity (neg), renal – neg (neg); leukocytes – 5-6 in visual field (1-2 in visual field); erythrocytes – 2-3 in visual field (neg); blennuria – a little (neg); bacteria – neg; cylinders – neg.

Urine analysis (norm), *12.10.01.*: weight – 1030 (1010-1020); colour – pale- yellow (straw-coloured); protein – 0.06 g/L (0,025-0,070); leukocytes – 3-4 in visual field (1-2 in visual field); epithelium – neg (neg); salt – neg; blennuria – moderately; reaction – acid.

Urine analysis (norm), *18.10.01*: weight – 1020 (1010-1020); colour – pale- yellow (straw-coloured); protein – 0.06 g/L (0.025-0.070); leukocytes –

2-3 in visual field (1-2 in visual field); epithelium – neg (0-3 in visual field); salt – neg; blennuria – moderately; reaction – acid.

**9.4.** (no. 4. Spyrogram)

<u>10.10.01.</u>

| Fuc | 1.16 | 1.24 | 94 | 98 |
|---|---|---|---|---|
| Feu\fuc(%) | 91.4 | 91.2 | 100 | 108 |
| Pef(l\s) | 2.58 | 1.75 | 147 | 152 |
| Mef(75%l\s) | 2.24 | 174 | 129 | 148 |
| Mtf(50%l\s) | 1.27 | 172 | 74 | 93 |
| Mef(25%l\s) | 0.71 | 0.92 | 17 | 107 |

*14.10.01.*

| Fuc | 1.16 | 1.24 | 94 | 98 |
|---|---|---|---|---|
| Feu\fuc(%) | 91.4 | 91.2 | 100 | 108 |
| Pef(l\s) | 2.58 | 1.75 | 147 | 152 |
| Mef(75%l\s) | 2.24 | 174 | 129 | 148 |
| Mtf(50%l\s) | 1.27 | 172 | 74 | 93 |
| Mef(25%l\s) | 0.71 | 0.92 | 17 | 107 |

**10. Moscow Clinical Hospital. Department of Haematology.**

Patient Aleksandrov V.S.

Card number – 1679. Room number – 10. Ward – 3.

Age: 12 years

Sex: male

Address: Orel, Visokaya str., 12.

Admission date: 17.03.2002.

Discharge date:

Referral diagnosis: haemophilia A

Clinical diagnosis: haemophilia A, severe form.

Complications: suppurating haematoma of left hand, posttraumatic flaccid paraparesis of lower extremities.

Coexisting diseases: chronic gastritis, reactive pancreatitis.

General inspection.

Consciousness is clear.

Position of the patient compelled, mainly sits. Reaction on survey is benevolent. Face look is quiet. The child is active, easily excitable. Appetite is kept. Sleep is quiet, duration coincides with a daily routine in a hospital.

Temperature is 36.7oC.

Breath type – mixed, RR – 19 beats/min.

At comparative percussion over symmetrical thorax sites a clear pulmonary sound is percussed. At auscultation of lungs a vesicular breath type is listened. Rattles and additional respiratory noises are absent. Bronchophony it is identical from the both sides.

On both humeral arteries BP is 110/70 mm Hg, HR-88 beats/min. Heart tones clear, sonorous, rhythm is correct.

Tongue is pink colouring, damp, is slightly covered by white incrustations, papillary layer is not changed.

The abdomen is slightly reduced in volume, of the correct form, symmetrical, the forward abdominal wall participates in breathing.

At survey of right subcostal area no changes has been revealed. Percussion of borders of absolute dullness of a liver on V.P.Obraztsov correspond norm, at carrying out Percussion borders of absolute dullness of a liver on M.G.Kurlov no pathology phase been revealed.

The spleen in the lying position on a back and on right side is not palpated.

Urination is free, 6–8 times a day, painless, in pampers.

Urine is straw-coloured, transparent, without visible impurities and sediments, with a common smell.

*Results of laboratory tests*

**10.1.** (Test no. 1).

Blood analysis (norm): *20.03.2002*: erythrocytes – $3.42 \times 10^6$/mm3 (4.0-5.6); Hb – 98 g/L (130-145); hematocrit – 28% (above 35%); mean erythrocytes volume – 82 fl (80-97); mean cont. of Hba in erythrocytes – 28.6 pg (27-31); mean conc.of Hb in er. – 34.7 g/L (32-36); er. anisocytosis index –

14.0% (until 14.5%); platelets – 220×103/mm3 (150-350); leukocytes – 11.6×109 /L (4.3-11.3); neutrophils: bands – 2% (1-6%), segmentated – 72.5% (47-72%); lymphocytes – 18.7 % (19-37%); monocytes – 5.8 % (3-11%); eosinophils – 1% (0.5-5%); basophils – 0% (0-1%); ESR – 36 mm/h(1-14).

Blood analysis (norm): *28.03.2002*: erythrocytes – 4.9×106/mm3 (4.0-5.6); Hb – 100 g/L (130-145); hematocrit – 31% (above 35%); mean er. volume– 86 fl (80-97); mean cont. of Hba in er. – 21.6 pg (27-31); mean Hb conc. in er. – 34.7 g/L (32-36); er. anisocytosis index – 13.0% (until 14.5%); platelets– 250×103/mm3 (150-350); leukocytes – 8.4×109 /L (4.3-11.3); neutrophils bands – 2% (1-6%), segmentated –54% (47-72%); lymphocytes – 33.2 % (19-37%); monocytes – 7.8 % (3-11%); eosinophils – 3% (0.5-5%); basophils – 0% (0-1%); ESR – 19 mm/h(1-14).

Blood analysissis (norm): *5.04.2002*: erythrocytes – 5.1×106/mm3 (4.0-5.6); Hb – 1 g/L (130-145); hematocrit – 35% (above 35%); mean er. volume – 86 fl (80-97); mean cont. of Hba in er. – 21.6 pg (27-31); mean Hb conc. in er.– 34.7 g/L (32-36); er. anisocytosis index – 14.0% (until 14.5%); platelets – 300×103/mm3 (150-350); leukocytes – 8.4×109 /L (4.3-11.3); neutrophils bands – 3% (1-6%), segmentated –54% (47-72%); lymphocytes – 33.3 % (19-37%); monocytes – 6.7 % (3-11%); eosinophils – 2% (0.5-5%); basophils – 1% (0-1%); ESR – 15 mm/h (1-14).

**10.2.** (Test no. 2). Urine analysis (norm), *25.03.2002*: colour – straw - yellow (straw -yellow); transparency – transparent (transparent); density – 1018 (1010-1020); reaction – acid (commonly acid); protein – traces (0.025-0.070); glucose – neg. (neg); epithelium – 1 in visual field (0-3 in visual field); leukocytes –1-2 in visual field (1-2 in visual field); salt – urates are not revealed.

Urine analysis (norm), *27.03.2002*: colour – straw-yellow (straw-yellow); transparency – transparent (transparent); density – 1010 (1015-1020); reaction – acid (acid); protein – no (0.025-0.070); glucose – neg. (neg.); epithelium – not revealed (0-3 in visual field); leukocytes – 1-2 in visual field (1-2 in visual field); salt – urates are not revealed.

**10.3.** (Test no. 3). Chemical blood test (norm), *19.03.2002*: whole protein total– 92 g/L (65-85); whole bilirubin– 15.8 µmol/L (8.6-20.5); AST – 0.21 mmol/L (0.1-0.45); ALT – 0.16 mmol/L (0.1-0.68); alkaline phosphatase– 487 U/L (70-612 un/L); urea – 4.5 mmol/L (2.5-8.3); creatinine – 83 µmol/L (53-97); serum Fe – 9.3 µmol /L (8.8-27.0); Fe-conn. ability – 58.5 µmol /L (45-70); glucose – 6.0 mmol/L (3.5-5.7); general LDH – 355 U/L (225-450).

Chemical blood test (norm), *21.03.2002*: whole protein – 82.2 g/L (65-85); whole bilirubin– 14.0 µmol /L (8.6-20.5); AST –0.23 mmol/L (0.1-0.45); ALT – 0.18 mmol/L (0.1-0.68); alkaline phosphatase a – 487 U/L (70-612); urea – 4.5 mmol/L (2.5-8.3); creatinine – 89 µmol /L (53-97); serum Fe – 11.5 µmol /L (8.8-27.0); Fe-conn. ability – 62.0 µmol /L (45-70); glucose – 5.0 mmol/L (3.5-5.7); general LDH – 355 U/L (225-450).

**10.4.** (Test no. 4). Chemical urine test (norm), *27.03.2002*: oxalates – 6.8 mg/24h (17); uric acid – 0.56 mmol/24h (2.4-6.0); calcium – neg. (below 60-160); phosporus – neg. (0.8-1.5); titrate acidity – 0.19 mmol/24h (0.2-1.5).

Chemical urine test (norm), *29.03.2002*: oxalates – 11.5 mg/24h (17); uric acid – 2.6 mmol/24h (2.4-6.0); calcium – neg (below 60-160); phosporus – neg (0.8-1.5); titrate acidity – 0.2 mmol/24h (0.2-1.5).

**11. State Clinical Hospital no. 31. Department of Pulmonology.**

Patient Grigorev G.N.

Card number – 1718. Room number – 9. Ward – 12.

Age: 71 years

Sex: male

Address: Moscow, Berovaya str, 54.

Admission date: 10.03.2002

Discharge date: 24.03.2002

Referral diagnosis: bronchial asthma, of mean severity. Pneumosclerosis.

Clinical diagnosis: Professional dependent on hormones non-infectious - bronchial asthma, of mean severity, at remission.

Complications: chronic obstructive lungs disease, emphysema.

Coexisting diseases: not revealed

General inspection.

Complaints: on an inspiratory dyspnoea amplifying at physical activity; periodic attacks of an asthma; mucopurulent sputum; difficulty of breath.

A condition satisfactory. Normotermia.

Integuments are faintly - pink. Lymph nodes are not palpated.

Hypostases are absent. Tones of heart are muffled, rhythmical. Blood pressure 130/90 mm Hg.

The abdomen is soft, painless. The liver is at the edge of a costal arch. Stool and diuresis are in norm.

Voice is sonorous.

The thorax is emphysematous, rigid, participates in breathing. Clavicles and shoulder-blades stick out poorly. Respiratory type the mixed. Number of breaths is 20-22 in minute in rest. Palpation: no painful sites at palpation are revealed. Vocal trembling of lungs is weakened. Comparative percussion: a box sound of the lungs.

Auscultation: weakened vesicular breath is listened over all surfaces of lungs; collateral respiratory noises are not listened. Bronchophony it is spent equally.

*Data of laboratory and instrumental tests:*

**11.1.** (Test no. 1). Blood analysis, *10.03.02*: Hb – 153 g/L (130-175); leukocytes – 11.9×109 /L (4.3-11.3); neutrophils: bands – 3% (1-6%), segmentated – 63% (47-72%); eosinophils - 9% (0.5- 5%); basophils – 0% (0-1%);lymphocytes – 34% (19-37%); monocytes – 4% (3-11%); ESR – 22 mm/h(1-14).

Blood analysis, *11.03.02*: Hb – 156 g/L (130-175); leukocytes – 7.468×109 L (4.3-11.3); neutrophils: bands – 2% (1-6%), segmentated – 55% (47-72%); eosinophils - 6% (0.5- 5%); basophils – 1% (0-1%); lymphocytes – 28% (19-37%); monocytes – 6% (3-11%); ESR – 17 mm/h(1-14).

Blood analysis, *11.03.02*: Hb – 150 g/L (130-175); leukocytes – 7.8×109 L (4.3-11.3); neutrophils: bands – 2% (1- 6%), segmented – 56% (47-72%); eosinophils - 4% (0.5- 5%); basophiles – 0% (0-1%); lymphocytes – 29% (19-37%); monocytes – 5% (3-11%); ESR – 15 mm/h(1-14).

**11.2.** (Test no. 2). Urine analysis (norm), *10.03.02*: weight - 1014 (1010-1026); transparency – muddy (transparent); colour - pale-yellow (straw-colour); reaction – acid (neutral or weak-acid); protein – 0.12 (0.025-0.070); leukocytes– 2-4 in visual field (1-2 in visual field); erythrocytes – single lixiviated.

Urine analysis (norm), *12.03.02*: weight — 1016 (1010-1026); transparency – transparent; colour - pale-yellow (straw-colour); reaction – weak-acid (neutral or weak-acid); protein – neg. (0.025-0.070); leukocytes – 0-1 in visual field (1-2 in visual field); erythrocytes – neg.

**11.3.** (Test no. 3).

Analysis of the external breathing function (norm), *10.03.02*: RR – 19; TV – 1100 ml (300-900 ml); ERV –800 ml (1500-2000 ml); IC –3700 ml (5000 ml); MLV – 68.1 (80-200 L/min); VC –3250 (3700 ml); FVC 4510 (5000);

Analysis of the external breathing function (norm), *16.03.02*: RR – 20; TV – 1050 (300-900 ml); ERV –900 ml (1500-2000 ml); IC – 4100 ml (5000 ml); MLV –78.1 (80-200 L/min); VC –3450 (3700); FVC -4300 ml (5000 ml);

Analysis of the external breathing function (norm), 5.04.02: RR – 20; TV– 1060 (300-900 ml); ERV –950 ml (1500-2000 ml); IC – 4200 ml (5000 ml); MLV –79.3 (80-200 L/min); VC –3400 (3700); FVC -4350 ml (5000 ml).

**12. Moscow Clinical Hospital. Department – pulmonological.**

Patient Firsiv B.V.

Card number – 5101. Room number – 41. Ward – 17.

Age: 45

Sex: male

Address: Krasnodar, Selskaya str., 15.

Admission date: 20.04.2000

Discharge date: 5.05.2000

Referral diagnosis: acute left-side pneumonia.

Clinical diagnosis: acute left-side low-lober pneumonia.

Complications: not revealed.

Coexisting diseases: chronic bronchitis, complicated by ectatic disease and emphysema, superficial gastritis, stenocardia of 1st class stress.

General inspection.

The general condition of the patient is of mean severity. Temperature is 37.5oC. Consciousness clear. Constitution is of normosthenic type. The constitution is regular; deformations and ugliness of a trunk, extremity and a skull are absent.

The head form is correct; involuntary movements of a head are absent. There is no hypostasis of eyelids and strabismus.

The skin colour is pink, sunburn traces are defined. Expressed cyanosis, ictericity and sites of pathological pigmentation are not observed. Humidity of skin is normal; turgor and elasticity of the skin correspond to norm. Visible mucous are of light pink colour and pure.

The hypodermically-fatty layer is developed moderately and distributed evenly. Hypostases are not revealed.

The respiratory System. Nasal breathing is difficult. The dyspnoea is of the mixed character. The voice is usual. Respiration type is mixed. Respiration is superficial. Thorax movements at respiration are not homogeneous: the left half lags behind the right. Respiration is rhythmical. Respiration rate is 20 in a minute.

The pharynx mucous is flushed. Tonsils are increased.

Cardiovascular system. Pulse is symmetric, rhythmical and of usual pressure and filling. The pulse form (speed) is not changed. Frequency is 72 beats in a minute. Blood pressure 120/80 mm Hg.

Gastroenteric System. The lips are light pink and damp. The tongue is pink, of normal forms and size; its back is imposed, and papillae are well expressed. The tongue mucous is damp, without visible defects.

The abdomen research. The abdomen has normal form and symmetrical. Abdominal swelling is not observed. The abdomen is not strained.

The urination system. Swellings in the kidney don't come to light visually. Kidneys are not palpated bimanually, painfulness at palpation is absent. The bladder is painless, of usual size.

*Data of laboratory and instrumental tests:*

**12.1.** (Test no. 1).

Blood analysis (norm), *20.04.2000*: erythrocytes – 4.95 mln/μL (4.0-5.6); Hb – 163 g/L (130-175); colour index – 1.0 (0.85-1.05); leukocytes – 12.9×109 /L (4.3-11.3); ESR – 34 mm/h(1-14); neutrophils: bands – 5% (1-6%), segmentated – 76% (47-72%); eosinophils - 1% (0.5- 5%); lymphocytes – 15% (19-37%); monocytes – 3% (3-11%).

Blood analysis (norm), *22.04.2000*: erythrocytes – 4.90 mln/μL (4.0-5.6); Hb – 160 g/L (130-175); colour index – 0.9 (0.85-1.05); leukocytes – 7.9×109 /L (4.3-11.3); ESR – 28 mm/h(1-14); neutrophils: bands – 3% (1-6%), segmentated – 77% (47-72%); eosinophils - 2% (0.5- 5%); lymphocytes – 16% (19-37%); monocytes – 2% (3-11%).

Blood analysis (norm), *27.04.2000*: erythrocytes – 5.0 mln/μL (4.0-5.6); Hb – 155 g/L (130-175); colour index – 0.95 (0.85-1.05); leukocytes – 6.1×109 /L (4.3-11.3); ESR – 17 mm/h(1-14); neutrophils: bands – 4% (1-6%), segmentated – 73% (47-72%); eosinophils - 3% (0.5- 5%); lymphocytes – 17% (19-37%); monocytes – 3% (3-11%).

**12.2.** (Test no. 2). Urine analysis (norm), *20.04.2000*: colour – yellow (straw-colour); transparency – transparent (transparent); weight 1.021 (1.008-1.024); reaction – acid; protein – 0.033 (0.025-0.070); leukocytes – 1-3 in visual field (1-2 in visual field); epithelium – flat 1-2 in visual field (0-3 in visual field).

**12.3.** (Test no. 3). Mucoid sputum test, *21.04.2000*: Quantity – 1.0 ml; colour – grey; type – mucous; consistence – viscous; leukocytes – numerous; erythrocytes – 8-10-12 in visual field; alveolar cells – 2-4 in visual field.

**12.4.** Changing of parameters of objective inspection:

*26.04.00*. in the morning 37.3o, in the evening 38.8o.

BP 120/80mm Hg. Ps 72 beats/min. RR 19.

*27.04.00*. in the morning 37.2o, in the evening 38.6o.

BP 100/60mm Hg. Ps 70 beats/min. RR 18.

*28.04.00*. in the morning 37.4o, in the evening 37.7o.

BP 110/80mm Hg. Ps 68 beats/min. RR 16.

*29.04.00*. in the morning 37.1o, in the evening 37.6o.

BP 105/70mm Hg. Ps 70 beats/min. RR 17.

*03.05.00*. in the morning 36.8o, in the evening 37.1o.

BP 105/60mm Hg. Ps 70 beats/min. RR 18.

**13. State Clinical Hospital no. 26. Department – endocrinology.**

Patient Velikanova S.D.

Card number – 918. Room number – 36. Ward – 8.

Age: 30

Sex: female

Address: Novgorod, Khmeln. Str., 118.

Admission date: 11.04.2001.

Discharge date: 24.04.2001

Referral diagnosis: diffuse-nodular [mixed] goiter, toxic of 2 degree, tireotoxicosis 1 degree.

Clinical diagnosis: diffuse-nodular [mixed] goiter, toxic 1a degree, tireotoxicosis 2 degree

Complications:

Coexisting diseases: insular diabetes of 1 type, of grave condition, decompensated, of labile course; iron-deficiency anaemia.

General inspection.

The general patient condition is satisfactory. Temperature 36.4oC. Consciousness is clear.

Integument colour is pale. Expressed cyanosis, ictericity and sites of pathological pigmentation are not observed. Humidity and elasticity of a skin is kept.

Visible mucous are of light pink colour and pure. Conjunctiva of the eyes is pink.

The hypodermically-fatty layer is developed moderately. Hypostases it is not revealed. Presence of crepitating is not revealed.

Respiratory system. Nasal breathing is free. Dyspnoea is absent. The voice is usual. Pharynx mucous is not flushed. Tonsils are not increased. Respiration is deep, rhythmical. RR is 20 in minute

Cardiovascular system. Pulse is symmetric, rhythmical, of satisfactory pressure and filling. Pulse speed is not changed. Frequency is 80 beats in a minute. Deficiency of pulse is absent. Pulse on both hands is identical. Blood pressure is 110/70 mm Hg.

Heart tones are clear, rhythm is regular. Bifurcation or splitting of heart tones is not revealed. Noise is absent.

Gastroenteric system. Lips' colour is light pink, lips are damp. The tongue's of pink colour, normal form and size; the tongue's back is not imposed, papillae are well expressed. The tongue mucous is damp, without visible defects.

Abdomen research: the abdomen is symmetrical and painless. The abdomen swelling is not observed. Hernias are not revealed. The abdomen participates in breathing.

The Liver and gallbladder research. The gallbladder is not palpated. Painfulness at palpation in a point of a gallbladder is absent. Liver pulsation is not observed. The liver is not palpated.

Urination System. Swellings in nephritic area do not come to light visually. Kidneys are not palpated bimanually. Percussion symptom is negative. A bladder is painless and of usual size.

*Data of laboratory and instrumental tests.*

**13.1.** (Test no. 1).

Blood analysis (norm), *12.04.01*: erythrocytes – 3.2 mln/μL (3.4-5.0); Hb– 110 g/L (120-160); colour index – 0.6 (0.85-1.05); platelets –170×109/L (180-320); leukocytes – 6.1×109 /L (3.2-10.2); neutrophils: bands – 2% (1-6%), segmentated – 46% (47-72%); lymphocytes – 46% (19-37%); monocytes– 6% (3-11%); ESR – 26 mm/h(2-20).

Blood analysis (norm), *14.04.01*: erythrocytes – 4.6 mln/μL (3.4-5.0); Hb– 121 g/L (120-160); colour index – 0.8 (0.85-1.05); platelets –180×109/L (180-320); leukocytes – 6.4×109 /L (3.2-10.2); neutrophils: bands – 3% (1-6%), segmentated – 48% (47-72%); lymphocytes – 44% (19-37%); monocytes– 7% (3-11%); ESR – 19 mm/h(2-20).

Blood analysis (norm), *20.04.01*: erythrocytes – 5.6 mln/μL (3.4-5.0); Hb– 130 g/L (120-160); colour index – 1.0 (0.85-1.05); platelets –185×109/L (180-320); leukocytes – 6.3×109 /L (3.2-10.2); neutrophils: bands – 1% (1-6%), segmentated – 50% (47-72%); lymphocytes – 46% (19-37%); monocytes– 5% (3-11%); ESR – 15 mm/h(2-20).

**13.2.** (Test no. 2).

Urine analysis (norm), *12.04.01*: colour - yellow (straw-colour); weight 1.012 (1.008-1.024); transparency – transparent (transparent); reaction – acid; protein – 0.012 (0.025-0.070); leukocytes – 0-1 in visual field (1-2 in visual field); epithelium flat – 1-2 in visual field (0-3 in visual field).

Urine analysis (norm), *14.04.01*: colour - yellow (straw-colour); weight 1.009 (1.008-1.024); transparency – transparent (transparent); reaction – acid; protein – 0 (0.025-0.070); leukocytes – 0-1 in visual field (1-2 in visual field); epithelium flat – 1-2 in visual field (0-3 in visual field).

**13.3.** (Test no. 3). Glycemic control (date/time/glucose level, mmol/L):

*12.04.01.*

$7^{00}$ – 10.5

$12^{00}$ – 16.2

$16^{00}$ – 10.5

$21^{00}$ – 11.0

*13.04.01.*

$7^{00}$ – 12.9

$11^{00}$ – 7.8

$16^{00}$ – 7.9

$21^{00}$ – 8.75

*16.04.01.* $7^{00}$ – 8.51

*17.04.01.* $7^{00}$ – 10.0

*24.04.01*

$7^{00}$ – 8.6

$12^{00}$ – 8.1

$16^{00}$ – 4.2

$21^{00}$ – 16.3

*26.04.01.* $21^{00}$ – 12.5

*27.04.01* $7^{00}$ – 11.1

*28.04.01*

$7^{00}$ – 10.5

$21^{00}$ – 3.0

**14. State Clinical Hospital no. 31. Cardiology Department.**

Patient Asfa I.I.

Card number – 1237. Room number – 15. Ward – 2.

Age: 66

Sex: female

Address: Letnii, 5.

Admission date: 5.04.1999.

Discharge date: 21.04.1999.

Referral diagnosis: rheumatism of inactive phase; associated mitral - tricuspidal heart disease; cardiac fibrillation .

Clinical diagnosis: rheumatism of inactive phase; associated mitral - tricuspidal heart disease; cardiac fibrillation .

Complications: no.

Coexisting diseases: Intolerance of aspirin (exacerbation of ulcerous disease of stomach and duodenal gut), strophanthine, brucellin, penicillin (edema and reddening of face and arms, Quincke's edema), and urticaria at consuming of smoked foods.

General inspection.

The general condition: satisfactory. Consciousness: clear. Position: compelled (orthopnea). The constitution: aesthetic. Growth - 158 cm, weight - 56 kg, body t – 36.3oC.

Integuments. Cyanosis of a skin of a nasolabiala triangle; acrocyanosis of a skin of distal phalanxes of fingers. Humidity of integuments: hyperhidrosis on all body, without dependence from daytime. Elasticity of a skin is lowered.

Lymph nodes: parotid, submaxillary, cervical, jugular, supracurvical, axillary, elbow and inguinal  are not probed. The skin over the e specified groups of lymph nodes isn't changed (there is no skin hypostasis, reddening, deformation and ulceration).

The general development of the muscular system: good, atrophies and hypertrophies of separate muscles and muscular groups are not observed. There is no painfulness at palpation of muscles. Muscle tone is normal, muscle force is satisfactory. Hypercynic frustrations are not revealed.

Complaints to pains in large joints - elbow, humeral, knee and femoral - arising after long static position of the externities, not irradiating, constants, nagging, of moderate intensity, passing after reception not-narcotic analgesics (analginum).

Respiratory system. Through breath, nasal breathing is free, sensations of dryness in a nose is absent. A voice is loud and pure. Respiration in a throat is not complicated. At survey a throat has regular form. At palpation of throat area painfulness is not defined.

At lungs auscultation a vesicular respiration in the bottom departments above lungs is defined. Crackling, crepitating, noises of pleura friction are not defined.

The cardiovascular system. At survey of neck vessels swelling of veins, weak pulsation of carotids is observed. The thorax in the heart area is not changed, heart hump is absent.

Pulse is identical on the right and left beam arteries, arrhythmic. Frequency - 84 beats/min, deficiency of pulse is absent, filling is satisfactory, not strained, small, low, form is normal, capillary pulse is not defined, BP 140/70 mm Hg. At survey and palpation of veins of externities varicous expansion of shins veins  is defined.

The mucous membrane of an internal surface of lips, cheeks, soft and a hard palates is pink; gums are light pink, do not bleed; the tongue is of normal size and form, pink, damp and pure; a pharynx is pink; a mucous membrane of the pharynx isn't flushed, damp, of smooth  surface.

The abdomen is of normal form, symmetric; collaterals on the abdomen surface are not expressed; pathologic peristaltic is absent; muscles of the abdomen wall participate in breathing; limited swelling of the abdomen wall at deep breathing and stress is absent.

The liver is palpated 1 cm below the edge of the rib arch (on right middle-clavicular line; the liver edge is dense, even, with smooth surface, slightly sharpen; left part of the liver is slightly painfulness; the gallbladder isn't palpated.

*Data of laboratory and instrumental tests:*

**14.1.** (Test no. 1).

Blood analysis (norm), *5.01.99*: Hb – 147 g/L (120-160); erythrocytes – 3.9×106 /µL (3.4-5.0); leukocytes – 11100 / µL (3200-10200); ESR –22 mm/h (2-20); colour index – 0.76 (0.85-1.05); neutrophils: bands – 7% (1-6%), segmented – 78% (47-72%); lymphocytes – 40% (19-37%); monocytes – 6% (3-11%).

Blood analysis (norm), *7.01.99*: Hb – 150 g/L (120-160); erythrocytes – 3.6×106 / µL (3.4-5.0); leukocytes – 5200 / µL (3200-10200); ESR – 5 mm/h (2-20); color index – 0.86 (0.85-1.05); neutrophils: bands – 1% (1-6%), seg-mentated – 60% (47-72%); lymphocytes – 33% (19-37%); monocytes – 6% (3-11%).

**14.2.** (Test no. 2). Chemical blood analysis (norm), *6.01.99*: AST – 47 IU (8-40); ALT – 17 IU (5-30); CPK – 60 IU; gamma-GT – 34 V; thymol test – 1.9 un. (0-4); alkaline phosphatise– 2.4 µmol (0.5-1.3); creatinine – 1.3 mg% (0.7-1.4); urea nitrogen – 26 mg % (10.0-20.0); whole protein – 7.2 g% (6.0-8.0); albumins – 4.6 g% (3.5-5.0); potassium – 3.8 meqv/L (3.5-5.0); sodium – 138 meqv /L (135-145); non-organic phosphor – 4.0 mg /%P (2.5-4.5); glucose – 110 mg % (80-120); uric acid – 5.6 mg % (2.5-7.0); whole bilirubin – 0.8 мг% (0.1-1.0); conjugated bilirubin – 0.4 mg % (until 0.3); fibrinogen – 3.0 g/L (2.0-4.0).

Chemical blood analysis (norm), *08.01.99*: AST – 45 IU (8-40); ALT – 19 IU (5-30); CPK – 60 IU; gamma-GT – 32 IU; thymol test – 2.2 un. (0- 4); alkaline phosphatise – 1.2 µmol (0.5-1.3); creatinine – 1.2 mg% (0.7-1.4); urea nitrogen – 24 mg% (10.0-20.0); whole protein – 7.0 г% (6.0-8.0); albumens – 4.4 g% (3.5-5.0); potassium – 4.1 meqv /L (3.5-5.0); sodium – 132 meqv /L (135-145); non-organic phosphor – 4.0 mg /%P (2.5-4.5); glucose – 100 mg % (80-120); uric acid – 5.8 mg % (2.5-7.0); whole bilirubin – 0.7 mg % (0.1-1.0); conjugated bilirubin – 0.3 mg % (until 0.3); fibrinogen – 3.5 g/L (2.0-4.0).

**14.3.** (Test no. 3).

Protein electrophoresis (norm), *7.01.99*: albumens – 53.9% (54-62%); alpha1 – 1.0% (2.7-5.1%); alpha2 – 5.9% (7.4-11.2%); beta – 15.3% (11.7-

15.3%); gamma – 18.4% (15.6-21.4%); Fe – 39 µg/dl (40.0-170.0); Fe saturation – 12.6% (20.0-55.0).

Protein electrophoresis (norm), от *12.01.99*: albumens – 55.6% (54-62%); alpha1 – 3.0 % (2.7-5.1%); alpha 2 – 9.4% (7.4-11.2%); beta – 15.3% (11.7-15.3%); gamma – 19.0% (15.6-21.4%); Fe – 55 µg/dl (40.0-170.0); Fe saturation – 22.5% (20.0-55.0%).

**14.4.** (Test no. 4).

*5.01.99.* Rheumatic tests: antihyaluronidase titre – less 250 un. (under 250); anti-oxygenempfindliches Streptolysin titre – less 250 un. (under 250); «C» - reactive protein - neg.; reaction Waaler-Rose - 1:20 (under 1:20); AT at DNS: native – 1.0 (under 1,1); denaturated – 0.7 (under 1,1).

*19.01.99.* Rheumatic tests: antihyaluronidase titre – 258 un. (under 250); anti-oxygenempfindliches Streptolysin titre – less 257 un. (under 250); «C» - reactive protein - neg.; reaction Waaler-Rose - 1:20 (under 1:20); AT at DNS: native –1.1 (under 1.1); denaturated – 0.8 (under 1.1).

**14.5.** (no. 5). Changing of parameters of objective inspection:

*5.04.99.* BP 140/60 mm Hg , HR 80 beats/min.

*7.04.99.* BP 130/65 mm Hg , HR 79 beats/min.

*11.04.99.* BP 130/55 mm Hg , HR 77 beats/min.

*13.04.99.* BP 125/70 mm Hg , HR 78 beats/min.

*15.04.99.* BP 115/55 mm Hg , HR 72 beats/min.

*16.04.99.* BP 125/60 mm Hg , HR 74 beats/min.

*18.04.99.* BP 120/55 mm Hg , HR 71 beats/min.

*20.04.99.* BP 115/60 mm Hg , HR 72 beats/min.

**15. Moscow Clinical Hospital no.1. Department of Surgery.**

Patient Verxova L.I.

Card number – 1777. Room number – 17. Ward – 15.

Age: 70

Sex: female

Address: Rostov, Gorky str, 82.

Admission date: 30.08.2000.

Discharge date: 29.09.2000.

Referral diagnosis: chronic calculus cholecystitis.

Clinical diagnosis: cholelithiasis gallstones; primary-chronic calculus cholecystitis.

Complications:

Coexisting diseases: axial cardiofundal fixed hernia of oesophagus foramen of diaphragm. hypochromic [erythronormoblastic] anemia

General inspection.

The condition is satisfactory; consciousness is clear.

Integuments are light pink and dry. In right iliac areas there is a hem after appendectomy. Elasticity and skin turgor it is kept.

Lymph nodes are not palpated. The muscular system is developed moderately. The skeleton-articulate system hasn't any pathological changes; bones and joints are of usual configuration; joints are painless at palpation; active and passive movements in joints are painless, in full.

Respiratory organs. Nasal breathing is free. Respiration is vesicular in all parts; bronchophony is identical over the symmetric thorax parts.

Cardiovascular system. At carrying out esophagogastroscopy signs of hernia of esophageal apertures of a diaphragm and esophagitis have been found out. Pulse is 84 beats in a minute, rhythmical, of normal fillings and pressure, symmetrical on both beam arteries; BP 140/90 mm Hg.

At survey of kidneys' area pathological changes nave not been found out. Kidneys are not palpated. Pasternatsky symptom is negative from both sides.

The tongue is damped, imposed by white incrustations and of normal size. At expectation of a pharynx a condition of palatal handles is satisfactory, tonsils are not increased in sizes, pink, without incrustations and purulent plugs.

The abdomen has the round form, symmetric, participates in breathing. The stomach is soft, painless, hernial outpouching is not found out, diastasis of direct muscles is absent.

The liver edge smooth, soft, roundish and does not go beyond a bottom edge of a costal arch; palpation is painless. The bilious gall is not palpated, the area of it is painless. The pancreas are painless at palpation, infiltrates and tumour-like formations are absent.

*Data of laboratory and instrumental tests:*

**15.1.** (Test no. 1).

Blood analysis (norm), *30.08.2000*: leukocytes – 10.7×109/L (3.2-10.2); erythrocytes – 4.41 mln/μL (3.4-5.0); Hb – 81 g/L (120-160); Ht – 26.3% (lowered); platelets – 37.0×103/mm3 (40-60); colour index – 0.59 (0.85-1.05); ESR – 20 mm/h(2-20); neutrophils: bands – 2% (1-6%), segmented – 67% (47-72%); eosinophils - 6% (0.5- 5%); platelets – 0 (0.25-1%); lymphocytes – 21% (19-37%); monocytes – 4% (3-11%).

Blood analysis (norm), *15.09.2000*: leukocytes – 9.86×109 /L (3.2-10.2); erythrocytes – 4.236 mln/μL (3.4-5.0); Hb – 95 g/L (120-160); Ht – 26.27% (lowered); platelets – 3.78×103/mm3 (40-60); colour index – 0.61 (0.85-1.05); ESR – 25 mm/h(2-20); neutrophils: bands – 1% (1-6%), segmented – 60.65% (47-72%); eosinophils – 4.17% (0.5- 5%); platelets – 1.38 (0.25-1%); lymphocytes – 26.16% (19-37%); monocytes – 6.64% (3-11%).

Blood analysis (norm), *15.09.2000*: leukocytes – 7.6×109 /L (3.2-10.2); erythrocytes – 4.23 mln/μL (3.4-5.0); Hb – 110 g/L (120-160); Ht – 26.27% (lowered); platelets – 39.6×103/mm3 (40-60); colour index – 0.72 (0.85-1.05); ESR – 18 mm/h(2-20); neutrophils: bands – 3% (1-6%), segmented – 60.2% (47-72%); eosinophils – 4 % (0.5- 5%); platelets – 1.2 (0.25-1%); lympho-cytes– 23.1% (19-37%); monocytes – 6.67% (3-11%).

**15.2.** (Test no. 2).

Urine analysis (norm), *30.08.2000*: colour - straw-colour (straw-colour); pH – 5.0; weight 1010 (1020-1026); transparency – transparent (transparent);

protein – neg. (0.025-0.070); glucose – neg. (neg); acetone – neg (neg); gall pigment – neg. (neg.); urobilin – 6N; epithelium – 0-1 in visual field (0-3 in visual field); leukocytes – 0-1 in visual field (1-2 in visual field).

Urine analysis (norm), *10.09.2000*: colour - straw-coloured (straw-coloured); pH – 5.0; weight 1016 (1020-1026); transparency – transparent (transparent); protein – neg. (0.025-0.070); glucose – neg.; acetone – neg; gall pigment – neg. (neg.); urobilin – 5N; epithelium – 0-1 in visual field (0-3 in visual field); leukocytes – 0-1 in visual field (1-2 in visual field).

**15.3.** (Test no. 3). Chemical blood analysis (norm), *30.08.2000*: alkaline phosphatise – 212 un/L (98-279); γ-GT – 32.54 un/L (7-49); AST – 42 mmol/L (0-40); ALT – 16 mmol/L (0-40); choline esterase - 9321 un/L (5600-12900); whole protein – 6.8 g/dL (6.0-8.0); albumen – 5.0 g/dL (3.5-5.0); creatinine – 0.9 mg/dL (0.7-1.4); non-org. P – 3.9 mg/dL (2.5-4.5); glucose - 92 mg/dL (80-120); urea nitrogen - 15 mg/dL (10-20); uric acid – 3.3 mg/dL (2.5-7.0); bilirubin: total–0.5 mg/dL (0.2-1.0); conjugated – 0.2 mg/dL (0.0-0.3); Na+ - 143.0 meqv/L (135-145); K+ - 4.94 meqv /L (3.5-5.0); albumens protein fraction – 57.3% (54-62%); α1-globulins – 4.1% (2.7-5.1%); α2- globulins – 9.7% (7.4 -10.2%); β- globulins – 15.1% (11.7-15.2%); γ- globulins – 13.8% (15.6-21.4%); cholesterol and triglycerides – 291 mmol/L (200-400).

Chemical blood analysis (norm), *15.09.2000*: alkaline phosphatise – 224 un /L (98-279); γ-GT – 29.8 un/L (7-49); AST – 49 mmol/L (0-40); ALT – 34 mmol/L (0-40); choline esterase - 8955 un/L (5600-12900); whole protein – 7.0 g/dL (6.0-8.0); albumen – 4.3 g/dL (3.5-5.0); creatinine – 0.8 mg/dL (0.7-1.4); non-org. P – 4.6 mg/dL (2.5-4.5); glucose - 105 mg/dL (80-120); urea nitrogen - 10 mg/dL (10-20); uric acid – 4.2 mg/dL (2.5-7.0); bilirubin: total–0.4 mg/dL (0.2-1.0); conjugated – 0.3 mg/dL (0.0-0.3); Na+ - 142.7 meqv/L (135-145); K+ - 4.69 meqv/L (3.5-5.0); albumens protein fraction – 60.1% (54-62%); α1- globulins – 4.5% (2.7-5.1%); α2- globulins – 8.3% (7.4 - 10.2%); β- globulins – 14.5% (11.7-15.2%); γ- globulins – 12.6% (15.6-21.4%); cholesterol and triglycerides – 291 mmol/L (200-400).

Chemical blood analysis (norm), *15.09.2000*: alkaline phosphatise – 230 un /L (98-279); γ-GT – 28.8 un /L (7-49); AST – 52 mmol/L (0-40); ALT – 29 mmol/L (0-40); choline esterase - 8955 un /L (5600-12900); whole protein – 7.0 g/dL (6.0-8.0); albumen – 4.3 g/dL (3.5-5.0); creatinine – 0.9 mg/dL (0.7-1.4); non-org. P – 4.6 mg/dL (2.5-4.5); glucose - 105 mg/dL (80-120); urea nitrogen - 10 mg/dL (10-20); uric acid – 4.2 mg/dL (2.5-7.0); bilirubin: total– 0.4 mg/dL (0.2-1.0); conjugated – 0.3 mg/dL (0.0-0.3); $Na^+$ - 142.7 meqv/L (135-145); $K^+$ - 4.60 meqv/L (3.5-5.0); albumens protein fraction – 60.1% (54-62%); α1- globulins – 4.5% (2.7-5.1%); α2- globulins – 8.3% (7.4 -10.2%); β-globulins – 13.5% (11.7-15.2%); γ- globulins – 11.6% (15.6-21.4%); cholesterol and triglycerides – 282 mmol/L (200-400).

**15.4.** (no. 4). Changing of parameters of objective inspection:

*5.09.2000*. Pulse 84 per min. BP – 140/90 mm Hg

*7.09.2000*. Pulse 90 per min. BP – 150/90 mm Hg

*13.09.2000*. Pulse 80 per min  BP – 145/85 mm Hg

*19.09.2000*. Pulse 76 per min. BP – 130/80 mm Hg

*21.09.2000*. Pulse 76 per min. BP – 150/80 mm Hg

*25.09.2000*. Pulse 85 per min. BP – 140/80 mm Hg

*26.09.2000*. Pulse 85 per min. BP – 140/80 mm Hg

*27.09.2000*. Pulse 80 per min. BP – 135/80 mm Hg

**16. State Clinical Hospital no. 31. Department – oncological.**

Patient Bakov L.T.

Card number – 7140. Room number – 12. Ward – 4.

Age: 51

Sex: male

Address: Moscow, Matr. str., 65.

Admission date: 19.03.1996.

Discharge date: continues treatment in the intensive therapy and reanimation department

Referral diagnosis: carcinoma antral stomach segment, 3 stage, against an atrophic gastritis.

Clinical diagnosis: carcinoma antral stomach segment, 3 stage.

Complications: chronic posthemorrhagic anaemia

Coexisting diseases: ischemic heart disease, stress stenocardia.

General inspection.

Condition of the patient is satisfactory. Position is active. A constitution is regular, there is no skeleton deformations. Hypodermically-fatty tissue is expressed moderately. Integuments are pale and pure. Venous lakes are visible on both sides of the face in area of cheekbone. Turgor is kept, the skin is dry, the elasticity is a little lowered. Visible mucous is of light pink colour.

The skeleton-muscular system. The general development of muscular system is good, muscles are painless palpation of muscles. Deformations of bones and painfulness at joints palpation are not detected. Joints have a usual configuration. Active and passive mobility in joints is full. The skull has a metriocephalic form The thorax form is regular.

Lymph nodes are not palpated. The thyroid gland is not increased, its consistence is soft and elastic. Thyrotoxicosis symptoms are absent.

Cardiovascular system. Pulse 80 beats in a minute, rhythmical, unstressed, has satisfactory filling, identical on the right and left hands.

System of respiratory organs. The thorax form is correct, both half equally participate in breathing. Respiration is rhythmical and of small depth (at change of position from horizontal in vertical respiration becomes more superficial). Respiration rate is 24 breaths in a minute.

System of digestive organs. Lips are dry, a red border of lips is pale and dry, a transition in a mucous part of a lip is expressed, the tongue is damp and imposed by greyish incrustations. Gums are pink, do not bleed, without the inflammatory phenomena. Pharynx mucous is damp, pink and pure.

The abdomen is symmetrical from both sides; the abdominal wall does not participate in breathing. At superficial palpation the abdominal wall is soft, painless, not strained.

The bottom edge of a liver doesn't go beyond a costal arch. The bilious gall is not palpated. Kidneys and the area of the urethras projection are not palpated, percussion on lumbar area is painless.

*Data of laboratory and instrumental tests:*

**16.1.** (Test no. 1).

Blood analysis (norm), *24.02.96*: Hb – 56 g/L (130-175); erythrocytes – 1.97 mln/µL (4.0-5.6); colour index – 0.86 (0.85-1.05); leukocytes – 5.7×109 /L (4.3-11.3); platelets – 200×109/L (180-320); eosinophils - 1% (0.5- 5%); neutrophils: bands – 8% (1-6%), segmentated – 39% (47-72%); lymphocytes – 37% (19-37%); monocytes – 15% (3-11%); ESR – 25 mm/h (1-14); anisocytosis ++; poikilocytosis +++; hypochromia ++.

Blood analysis (norm), *16.03.96*: Hb – 60 g/L (130-175); erythrocytes – 3.1 mln/µL (4.0-5.6); platelets190×109/L (180-320); colour index – 0.89 (0.85-1.05); leukocytes – 6.9×109 /L (4.3-11.3); eosinophils - 1% (0.5- 5%); neutrophils: bands – 4% (1-6%) segmentated – 63% (47-72%); lymphocytes – 20% (19-37%); monocytes – 11% (3-11%); ESR – 19 mm/h (2-20 mm/ h); anisocytosis +++; poikilocytosis +++.

Blood analysis (norm), *24.03.96*: Hb – 86 g/L (130-175); erythrocytes – 3.01 mln/µL (4.0-5.6); colour index – 0.82 (0.85-1.05); leukocytes – 11.6×109 /L (4.3-11.3); neutrophils: bands – 3% (1-6%), segmentated – 68% (47-72%); platelets – 184×109/L (180-320);; eosinophils - 1% (0.5- 5%); lymphocytes – 18% (19-37%); monocytes – 10% (3-11%); ESR – 50 mm/h (2-20 mm/ h); anisocytosis +++; poikilocytosis +++; hypochromia +.

**16.2.** (Test no. 2).

Urine analysis (norm), *19.03.96*: colour - pale-yellow (straw-coloured); reaction – acid; weight 1.020 (1.008-1.024); protein – 0.033 g/L (0.025-0.070);

glucose – 0; leukocytes – 1-4 in visual field (1-2 in visual field); erythrocytes – 0-2 in visual field (single); epithelium – 1-3 in visual field (0-3 in visual field);

Urine analysis (norm), *16.03.96*: colour - pale -yellow (straw-coloured); reaction – acid; weight 1.012 (1.008-1.024); protein – 0.022g/L (0.025-0.070); glucose – 0; leukocytes – 1-2 in visual field (1-2 in visual field); erythrocytes single in visual field; epithelium – 1-3 in visual field (0-3 in visual field);

Urine analysis (norm), *24.03.96*: colour - pale -yellow (straw-coloured); reaction – acid; weight 1.010 (1.008-1.024); protein neg. (below 0.025-0.070); glucose – neg.; leukocytes – 0-1 in visual field (1-2 in visual field); erythrocytes single in visual field; epithelium – 1-2 in visual field (0-3 in visual field);

**16.3.** (Test no. 3).

Chemical blood analysis (norm), *27.03.96*: whole protein – 6.4 (6.0-8.0); albumen – 3.8 g/dl (3.5-5.0); α1-globulin - 6% (2.7-5.1%); α2- globulin – 19% (7.4 - 10.2%); γ- globulin – 19% (15.6-21.4%); thymol test –1un. (0-4); sublimate test – 2.0 mL (1.6-2.2); AST – 20 mmol/L (0-40); ALT – 26 mmol/L (0-40); bilirubin total– 6 μmol/L (8.6-20.55); alkaline phosphatise – 7.8 mg% (9-14); creatinine – 0.3 (0.4-1); cholesterol total–6.54 mmol/L(3.11-6.48).

Chemical blood analysis (norm), *28.03.96*: protein total– 6.3 (6.0-8.0); albumen – 3.6 g/dl (3.5-5.0); thymol test – 11un (0-4); sublimate test – 5.1 ml (1.6-2.2); α1- globulin – 5.8% (3-5.6%); α2- globulin – 18% (6.9 -10.5%); γ-globulin –20% (15.6-21.4%); AST – 24un (8-40); ALT – 28un (5-30); bilirubin total – 8.8μmol/L (8.6-20.55); alkaline phosphatise – 9.1(9-14); creatinine – 0.35 mg%(0.4-1); whole cholestetin– 6.9 mmol/L (3.11-6.48).

**16.4.** (no. 4). *Changing of parameters of objective inspection:*

*22.03.96.* T in the evening 37.2, T in the morning 36.8. BP 130/80 mm Hg Pulse 80/min.

*23.03.96.* T in the evening 36.8, in the morning 36.9. BP 130/90 mm Hg Pulse 87/min. RR 23/min.

*26.03.96.* T in the evening 36.6, in the morning 36.5. BP 120/90 mm Hg Pulse 90/min. RR 20/min.

After therapy aimed on the anaemia correction, the radical operation is indicated: a subtotal resection of a stomach with imposing gastroenteroanastomosis imposing on Bilrot 2. Date 27.03.96.

Operation: a subtotal resection of a stomach on Bilrot 2 Beginning of operation 11 h. 25 minutes. The termination of operation 13 h. 25 minutes.

The surgeon: prof. Postrelov H.A.

The assistant: acc. Tokarev C.C.

The anaesthesiologist: Tokarev I.I.

Type of anaesthesia: premedication: 1 ml of atropine 1 % atropine, droperidol 2 ml, fentanyl 2 ml, initial intravenous narcosis: thiopental sodium 50 mg, mask diethyl ether  narcosis, tracheas intubation  and transfer on AVL an aether and oxygen.

Patient it is translated into resuscitation and intensive therapy Department.

**17. State Clinical Hospital no. 15. Department of Infectious Diseases.**

Patient Salim K.P.

Card number – 1144. Room number – 12. Ward – 5.

Age: 58

Sex: female

Address: Chelni, Kosm. Str, 4

Admission date: 3.06.98.

Discharge date: 24.06.98.

Referral diagnosis: acute gastroenteritis

Clinical diagnosis: acute dysentery, atypical course, coloenteritic form (revealed Sh. Flexneri IIA).

Complications: no.

Coexisting diseases: chronic haemorrhoids, exacerbation phase. chronic posthemorrhagic anaemia of slight rate

General inspection.

The general condition is satisfactory. Consciousness is clear. Type of a constitution is the hypersthenic.

Integuments. The skin is pale, hyperceratosis of elbows is available. Elasticity of a skin is lowered. On a course of intercostal nerves on a forward abdomial wall and on a back there are sites of an atrophy and skin depigmentation skin (traces of having serpiginosa). On an average line of the abdomen there is a postoperative hem.

Nosal mucous is pink, shining, expectoration is absent. Mouth mucous is pink, damp, shining, hyperptyalism is absent. Conjunctiva is pure, shining, damp. B The throax back wall is slightly flushed; there is no pain an incrustations in the throat.

Palpation of some muscular groups is painless. Force of muscles issufficient, the tone is kept.

Respiratory system. Nasal meatus are free, expectoration from a nose ois absebt. Respiration over the all surface of lungs is vesicular. Rales, crepitation and noises of pleura friction are not listened.

Tones of heart are muffled. A rhythm is correct. Systolic noise on a top and in Botkin's point is listened. BP – 100/70 mm hg. Pulse 64 beats/min, of the lowered filling and pressure. Elasticity of a vessels walls is kept.

The tongue is damp and imposed by white incrustations; along the tounge edges there are prints of a teeth.

Gums are pink, moderately damp.

At survey the abdomen is of the correct form, does not support edge of costal arches, though there is an increase in its volume due to hypodermic fatty tissue; hypodermic veins are not expanded; the skin pale and dry.

Superficial palpation of the intestines is painless except the left iliac area.

Palpation of the point of a bodyand a pancreas tail is painless.

Symptoms of a bilious gall are negative.

The liver and spleen are without features.

It was not possible to palpate kidneys. Palpation of the middle and ureters' points is painless. The bladder is palpated over the pubs joint in the form of roundish formation of hardly elastic consistences, painless. Function of craniocereberal nerves is kept. tendinous and abdominal reflexes are not raised. Pathological reflexes and meningeal signs are not revealed.

*Data of laboratory and instrumental tests:*

**17.1.** (Test no. 1).

*Day 1.* Blood analysis (norm): erythrocytes – 3.2 mln/μL (3.4-5.0); Hb – 98 g/L (120-160); leukocytes – 15.8×109 /L (3.2-10.2); eosinophils - 5% (0.5-5%); neutrophils: bands – 8% (1-6%), segmentated – 57% (47-72%); lymphocytes – 31% (19-37%); monocytes – 9% (3-11%); colour index – 1.0 (0.85-1.05); platelets – 51×103 mm3 (40-60); ESR – 35 mm/h (2-20).

*Day 3.* Blood analysis (norm): erythrocytes – 3.9 mln/μL (3.4-5.0); Hb – 92 g/L (120-160); leukocytes – 13.8×109 /L (3.2-10.2); eosinophils - 4% (0.5-5%); neutrophils: bands – 6% (1-6%), segmentated – 58% (47-72%); lymphocytes – 28% (19-37%); monocytes – 14% (3-11%); colour index – 1.0 (0.85-1.05); platelets – 52×103 mm3 (40-60); ESR – 30 mm/h(2-20).

*Day 7.* Blood analysis (norm): erythrocytes – 4.1 mln/μL (3.4-5.0); Hb – 100 g/L (120-160); leukocytes – 8.8×109 /L (3.2-10.2); eosinophils - 1% (0.5-5%); neutrophils: bands – 4% (1-6%), segmentated – 60% (47-72%); lymphocytes – 30% (19-37%); monocytes – 15 (3-11%); colour index – 1.0 (0.85-1.05); platelets – 54×103 mm3 (40-60); ESR – 24 mm/h (2-20).

**17.2.** (Test no. 2).

*Day 1.* Urine analysis (norm): colour - gold-yellow (straw-colored); transparency – not full (transparent); weight 1.011 (1.008-1.024); protein – neg. (0.025-0.070); glucose – neg. (neg.); leukocytes – 8-10 in visual field (1-2 in visual field); epithelium plane – 6-8 in visual field (0-3 in visual field)

*Day 3.* Urine analysis (norm): colour - gold -yellow (straw-colored); transparency – transparent (transparent); weight 1.020 (1.008-1.024); protein –

neg. (0.025-0.070); glucose – neg. (neg.); leukocytes – 4-5 in visual field (1-2 in visual field); epithelium plane – 2-3 in visual field (0-3 in visual field)

*Day 7.* Urine analysis (norm): colour - gold -yellow (straw-colored); transparency – transparent (transparent); weight 1.014 (1.008-1.024); protein – neg. (0.025-0.070); glucose – neg. (neg.); leukocytes – 1-3 in visual field (1-2 in visual field); epithelium plane – 0-1 in visual field (0-3 in visual field)

**17.3.** (no. 3). *Changing of parameters of objective inspection:*

*9.06.98.* Pulse-80 beats/min. RR-18 per min. Temperature 38.0°C. BP-130/90 mm Hg

*10.06.98.* Pulse-77 beats/min. RR-20 per min. Temperature 37.5°C. BP 130/90 mm Hg.

*11.06.98.* Pulse-64 beats/min. RR-16 per min. Temperature 37.1°C. BP110/80 mm Hg.

*12.06.98.* Pulse-66 beats/min. RR-15 per min. Temperature 37.0°C. BP120/75 mm Hg.

*13.06.98.* Pulse-62 beats/min. RR-16 per min. Temperature 36.8°C. BP115/65 mm Hg.

*14.06.98.* Pulse-64 beats/min. RR-18 per min. Temperature 36.6°C. BP125/85 mm Hg.

**18. State Clinical Hospital no. 31. Polyclinic Department.**

Patient Kazan T.S.

Card number – 3410. Room number – 15. Ward – 18.

Age: 43 years

Sex: male

Address: the Rostov region, Mines, street of Miners, 15.

Date of the reference to the doctor: 6.03.2001.

Date of closing of the sick-list: 16.03.2001.

Referral diagnosis: —

Clinical diagnosis: a curvature of a nasal partition, chronic catarrhal rhinitis Complications: no.

Coexisting diseases: no.

General inspection.

The general condition is satisfactory. Consciousness isclear. Patient is correctly focused in time and space. A constitution of hypersthenic type.

Integuments are of usual colouring and moderate humidity. Hypostases are absent. Pulse is 75 beats/min, the rhythm is correct, the filling is good. Respiratory rate is 18 / mines, a rhythm is correct. Working Blood pressure 130 and 80 mm hg .

The nose and perirhinal sinuses. The form of an external nose is not changed. Integuments in the field of the external nose and projection of perirhinal sinuses is of usual colouring. Palpation and percussion in the field of an external nose and perirhinal sinuses projections are painless. Palpation and percussion of 1 and 2 points of an exit of a trigeminal nerve are painless. Crepitation is absent.

Respiration is through the right nostril is absent, through the left nostril is complicated. The olfaction is slightly lowered. A mucous membrane is flushed and edematous. Nasal conchas are edematous and flushed. In the bottom nasal conchas there is a small amount of the serous secretion. The nose partition is bent to the right.

Regional lymth nodes: submandibular nodes are not palpated.

Nasopharynxes mucous is bright-pink, mouths of acoustical pipes and tubar cushions are without any pathology.

Regional lymth nodes: superficial cervical lymth nodes are not palpated

Mouth mucous is of usual colouring, without pathological changes. The tongue is pure and damp. The fauces mucous membrane is bright-pink, a hypostasis and infiltration are absent. Palatal tonsils are absent (tonsillectomy at age 18 years).

At survey the throat area is not changed. Integuments are without changes, palpation it is painless, crepitation symptom is positive, the throat is passive at palpation. The voice is sonorous, the breath is free.

Regional lymth nodes: superficial cervical lymth nodes are not palpated

Ears. The areaof the mammiform appendices and an auricle is not changed at external examination and palpation. Palpation and percussion are painless. The auricle is formed correctly. Pathological secretion is absent. The smell is absent.

*Data of laboratory and instrumental tests:*

Pure tone audiometry.

At the analysis of pure tone audiogramm hearing decrease (on type condactive or neurosensor relative deafness) it is not revealed.

**18.1.** (Test no. 1).

*Day 1*. Blood analysis (norm): erythrocytes – 4.6 mln/µL (4.0-5.3); leukocytes – 25.70×109 /L (4.3-11.3); Hb – 140.9 g/L (130-175); platelets – 232.7×109 (180-320); ESR – 50 mm/h(1-14); colour index – 0.94 (0.85-1.05); neutrophils: bands – 1% (1-6%), segmentated – 56% (47-72%); eosinophils - 4% (0.5- 5%); lymphocytes – 29% (19-37%); monocytes – 10% (3-11%).

*Day 3*. Blood analysis (norm): erythrocytes – 4.4 mln/µL (4.0-5.3); leukocytes – 20.70×109 /L (4.3-11.3); Hb – 138 g/L (130-175); platelets – 234×109 (180-320); ESR – 40 mm/h(1-14); colour index – 0.91 (0.85-1.05); neutrophils: bands – 2% (1-6%), segmentated – 54% (47-72%); eosinophils - 5% (0.5- 5%); lymphocytes – 30% (19-37%); monocytes – 9% (3-11%).

*Day 7*. Blood analysis (norm): erythrocytes – 4.2 mln/µL (4.0-5.3); leukocytes – 13.70×109 /L (4.3-11.3); Hb – 140 g/L (130-175); platelets – 230×109 (180-320); ESR – 22 mm/h(1-14); colour index – 0.90 (0.85-1.05); neutrophils: bands – 1% (1-6%), segmentated – 63% (47-72%); eosinophils - 3% (0.5- 5%); lymphocytes – 25% (19-37%); monocytes – 8% (3-11%).

**18.2.** (Test no. 2).

*Day 1*. Urine analysis (norm): colour – pale-yellow (straw-colored); reaction – pH 6.5; weight – 1.015 (1.008-1.024); transparency – not full (transparent); protein – neg. (0.025-0.070); glucose – neg. (neg.); acetone – neg. (neg.); gall pigments – neg. (neg.); epithelium – 0-3 in visual field (0-3 in visual field); leukocytes – 2-4 in visual field (1-2 in visual field); erythrocytes – single (single); salt – neg. (neg.).

*Day 3*. Urine analysis (norm): colour – pale -yellow (straw-colored); reaction – pH 6.6; weight – 1.017 (1.008-1.024); transparency – not full (transparent); protein – no (0.025-0.070); glucose – neg. (neg.); acetone – neg. (neg.); gall pigments – neg. (neg.); epithelium – 0-3 in visual field (0-3 in visual field); leukocytes – 1-2 in visual field (1-2 in visual field); erythrocytes – single (single); salt – neg. (neg.).

*Day 7*. Urine analysis (norm) colour – pale -yellow (straw-colored); reaction – pH 6.7; weight – 1.013 (1.008-1.024); transparency – full (transparent); protein – neg. (0.025-0.070); glucose – no (no); acetone – neg. (neg.); gall pigments – neg. (neg.); epithelium – 0-3 in visual field (0-3 in visual field); leukocytes – 0-1 in visual field (1-2 in visual field); erythrocytes – single (single); salt – neg. (neg.).

**19. Moscow Clinical Hospital. Pulmonological department**

Patient: Alojan D.A.

Card number – 1718. Room number – 35. Ward – 106.

Age: 13 years

Sex: female

Address: Balashikha, World street, 18

Admission date: 24.06.98.

Discharge date: 23.07.98

Referral diagnosis: miliary tuberculosis, Scientific Research Institute of phthisiopulmonology for diagnosis acknowledgement and treatment.

Clinical diagnosis: generalized a tuberculosis; tuberculosis of intrachest lymth nodes; tubercular pleurisy on the right, a tuberculosis mesenteric lymth nodes with peritoneum defeat.

Complications: no.

Coexisting diseases: no

General inspection.

The condition is of average severity at admissiont. CT of the thorax revealed hyperplastic intrachest lymph nodes of non-uniform structure from both parties.

The general condition is satisfactory. Consciousness is clear. Speech is correct, distinct. Sleep is not broken. Craniocereberal nerves are without a pathology.

Physical development is normal. Weight: 42 kg. Growth: 153см. A constitution is regular. Integuments are swarty. Hypodermic fatty tissue is developed moderately.

Eyes are clear. Nasal respiration is free. The voice is sonorous. A cough and short wind are absent.

Respiration is of chest. Frequency of breath, RR, is 20 in a minute. Breath is rhythmical. The thorax is of good elasticity. Vocal trembling is spent uniformly in all part.

Heart tones are clear. Heart rate is 84 beats per minute. A rhythm is correct. Noise, additional tones are absent. Blood pressure 110/70.

Lips are pink; dryness and chaps are absent. Mucous of an internal surface of lips, cheeks, firm and a soft palate is light pink, damp, without pigmentation, uclerations. The tongue is imposed by white incrustations, of normal size and form, damp.

The abdomen is of the roundish form, the sizes are not increased, symmetric, is not blown up, a navel is drawn. At abdomen percussion a tympanitis of various degree of expressiveness is observed. Congestions of a

free liquid in a an abdomial cavity, cysts and fluctuations are not revealed. Mendel's symptom is negative.

The sizes of absolute hepatic dullness on Kurlov: 9x8x7.

At superficial palpation of right subcostal area, epihastal area and zones of a projection of a bilious gall painful sensations are not revealed. The liver is not palpated. The bilious gall is not palpated. Morbidities at palpation in points of a bilious gall it is not revealed. Urine is yellow transparent. Kidneys are not palpated. The bladder does not bounds by pubic joint, is not palpated.

*Data of laboratory and instrumental tests:*

**19.1.** (Test no.1). Blood analysis:

*Day 1.* Hb – 118.0 g/L (120-160); erythrocytes – 3.8 mln/μL (3.4-5.0); platelets – 202×109 /L (180-320); leukocytes – 16.3×109 /L (3.2-10.2); mielocytes – neg. (0); metamielocytes – 1 (0); bands – 8 (1-6); segmentated – 48 (47-72); eosinophils – 3 (0.5-5); platelets – neg. (0-1); lymphocytes – 29 (19-37); monocytes – 11 (3-11); ESR – 38 mm/h(2-20).

*Day 7.* Hb – 119,0 g/L (120-160); erythrocytes – 3.91 mln/μL (3.4-5.0); platelets – 210×109 /L (180-320); leukocytes – 16,0×109 /L (3.2-10.2); mielocytes – neg. (0); meta mielocytes – 1 (0); bands – 7 (1-6); segmentated – 50 (47-72); eosinophils – 4 (0.5-5); platelets – neg. (0-1); lymphocytes –26 (19-37); monocytes – 12 (3-11); ESR – 38 mm/h (2-20).

*14 day.* Hb – 120,0 g/L (120-160); erythrocytes – 4.12(3.4-5.0 mln/μL); platelets – 208×109 /L (180-320); leukocytes – 15.8×109 /L (3.2-10.2); mielocytes – neg. (0); metamielocytes – 1 (0); bands – 7 (1-6); segmentated – 52 (47-72); eosinophils – 2 (0.5-5); platelets – neg. (0-1); lymphocytes – 25 (19-37); monocytes – 11 (3-11); ESR – 38 mm/h (2-20).

**19.2.** (Test no.2). Urine analysis, 24.06.98

Colour – straw-yellow (straw-colored), transparency – full (transparent); weight – 1.020 (1.008-1.024), leukocytes – 1-2 in visual field (1-2 in visual field); erythrocytes – 0-1 in visual field (0-1 in visual field); reaction – wek-acid; protein – neg; epithelium – few; glucose – neg; blennuria - moderate.

**20. Moscow Clinical Hospital. Department of Surgery.**

Patient: Sviridov V. M.

Card number – 4325. Room number – 15. Ward – 107.

Age: 51 year

Sex: male

Address: Moscow, Horoshevsky highway, 52

Admission date: 13.03.2002 (5 day illnesses)

Discharge date: 01.04.2002

Referral diagnosis: left shin erysipelas

Clinical diagnosis: erythematous erysipelas of the left bottom limb, primary, moderate severity level.

Complications: no.

Coexisting diseases: Mycosis of nails of the bottom finitenesses.

General inspection.

The general condition: moderate severity, closer to the satisfactory. Consciousness: clear. Position of the patient: active. A constitution: asthenic.

Growth of 176 cm, weight of a body of 74 kg, t0C=36.60C.

Integuments out of the nidus are of light pink colouring. Colouring of visible mucous is normal. Integuments are pure. Humidity of integuments is norm. Elasticity of a skin is norm. Growth of hair is not broken, hirsuties is of man's type. Nails on hands are not changed.

Development of hypodermic fatty tissue is moderated, it is uniformly distributed. It is defined Moderated pitting edema of the left bottom limb.

When viewed lymph nodes are not visible. On palpation of 4-5 inguinal lymph nodes are determined 0.5 cm, soft elastic consistency, slightly painful, mobile, weakly painful. The skin adjacent to the lymph nodes and without subcutaneous tissues are absent. Signs of lymphangitis are absent. The general development of muscular system - moderated. Muscles tones is norm. Muscular force is satisfactory. Hypercionical disorders are not revealed.

Breath system. Thre are no complaints. At survey, percussion and palpation changes and defects are not observed. At ayscultation the breath norm, without noises

Hearts pathologies are not revealed. Blood pressure 130/80 mm Hg.

Survey and palpation of kidneys area have not shown any deviations from the norm.

Research of a thyroid gland has not found out any pathology.

Mycosis of nails of the bottom legs. (Nail plates of toes are thickened, grey-yellow, their surface is rough, a subnail hyperceratosis is present).

*Data of laboratory and instrumental tests:*

**20.1.** (Test no. 1). Urine analysis.

*Day 1.* Reaction – pH 4.5; weight – 1.020 (1.008-1.024); transparency – not full (transparent); protein – 0.089 (0.025-0.070); glucose - neg. (neg); aceton – neg (neg); gall pigments - neg. (neg); urobilin – in norm; epith.cells.pl.– a little (0-3 in visual field); leukocytes - 2-4 in v/f (1-2 in visual field); erythrocytes – single (0-1 in visual field); salt oxalate – a little (neg); bacterea – moderate amount.

*Day 3.* Reaction - pH-5; weight – 1.016 (1.008-1.024); transparency – not full (transparent); protein – 0.075 (0.025-0.070); glucose - neg.; aceton - neg; gall pigments - neg.; urobilin - in norm; epith.cells.pl. – a little (0-3 in visual field); leukocytes - 2-3 in v/f (1-2 in visual field); erythrocytes – single (0-1 in visual field); salt oxalate – a little (neg); bacterea - moderate amount.

*Day 7.* Reaction - pH-5.5; weight – 1.015 (1.008-1.024); transparency – not full (transparent); protein – 0.066 (0.025-0.070); glucose - neg. (neg); aceton – neg (neg); gall pigments - neg. (neg); urobilin - in norm; epith.cells.pl.– a little (0-3 in visual field); leukocytes - 1-2 in v/f (1-2 in visual field); erythrocytes – single (0-1 in visual field); salt oxalate – a little (neg); bacterea - moderate amount.

**20.2.** (Test no. 2).

*Day 1.* Blood analysis (norm). Leukocytes – 17.8×109 /L (4.3-11.3); erythrocytes – 4.96×1012/L (4.0-5.6); Hb - 137 g/L (130-175); ESR - 30 mm/h (1-14); bands - 3% (1-6%); segmentated -52% (47-72%); eosinophils - 7 (0.5-5 %); monocytes - 6% (3-11 %); lymphocytes - 32% (19-37 %).

*Day 3.* Blood analysis (norm). Leukocytes – 15.8×109 /L (4.3-11.3); erythrocytes – 4.90×1012/L (4.0-5.6); Hb - 139 g/L (130-175); ESR - 24 mm/h (1-14); bands - 1% (1-6%); segmentated -61% (47-72%); eosinophils - 5 (0.5-5%); monocytes - 5% (3-11 %); lymphocytes - 28% (19-37 %).

*Day 7.* Blood analysis (norm). Leukocytes – 11.8×109 /L (4.3-11.3); erythrocytes – 4.88×1012/L (4.0-5.6); Hb - 142 g/L (130-175); ESR - 17 mm/h(1-14); bands - 2% (1-6%); segmentated -60% (47-72%); eosinophils - 4 (0.5-5 %); monocytes - 7% (3-11 %); lymphocytes - 27% (19-37 %).

**21. State Clinical Hospital no. 1. Infectious department**

Patient: Puhovets G. V

Card number – 2378. Room number – 8. Ward – 13.

Age: 21 year

Sex: female

Residence: Stavropol Territory Stary Oskol, street of Kirov, 7

Admission date: 22.03.2002

Discharge date: 18.04.2002

Referral diagnosis: acute virus hepatitis B

Clinical diagnosis: acute virus hepatitis B (HbsAg +, a-Hbcor IgM +) of the icteric form, current of mean severity, with cholestasis phenomena

Complications: no

Coexisting diseases: a chronic not obstructive pyelonephritis

23/03/2002 – is hospitalised in urological department of SCH no. 54 with the diagnosis of acutea sharp not obstructive pyelonephritis. leukocytosis in blood – 19.5× 109/L.

25/03/2002 – whole bilirubin – 22.0 mkmol/L, ALT – 483 un/L, AST – 428 units/L. Urine analysis – leukocytes - 44-52 in v.f., erythrocytes – 3-5 in v.f.

01/04/2002 – conjugated bilirubin – 97 mkM/L, unconjugated – 72 mkM/L мкM/L, AST – 285 un/L, ALT – 184 units/L.

02/04/2002 – the decision to transfer the patient into the infectious hospital no. 2 is approved after the consultation with the infectious disease doctor.

General inspection.

The general condition of average severity. The patient is languid, marks strong weakness, drowsiness; the consciousness clear, sleep doesn't disturbed. A constitution if on normosthenic type.

Integuments and visible mucous show the expressed yellowness of skin and scleras. Vascular asterisks are absent. Haemorrhagic rash is absent, Haemorrhagic elements appeared on lateral surfaces of a thorax at admission. The turgor it is kept. Nails are without changes. The skin is warm and damp.

Hypodermic tissue is developed poorly. Hypostases are absent.

Nasal respiration is slightly difficult. Sense of smell is kept. Respiration type is chest. Frequency of respiratory movements - 18 in a minute. A rhythm is correct.

Percussion sound is clear and pulmonary. Nidal changes of a percussion sound is not observed. Borders of lungs are in norm. Respiration is listened over the all surface of lungs, is vesicular. Rales and other pathological noise are absent.

At survey of the heart area changes were not revealed. Heart push is absent. Tones of heart clear, rhythmical. Frequency of heart reductions is 70 blows in a minute. Pathological noises are not listened.

Blood pressure 90/60 mm Hg. At auscultation of large vessels noises are not listened.

Mouth mucous is without changes, pure; the tongue is not imposed and bright pink.

The abdomen is flat, symmetric, soft; its palpation is painless. The intestines are not palpated. At palpation in Shoff zone painfulness it is not marked.

The liver edge is painless at palpation, of elastis consistence, goes beyond the under a costal arch on 3 cm. Liver sizes by Kurlov: 11/3-10-9 cm.

Bilious gall is not palpated. Morbidity in a point of a bilious gall is absent. Murphy's and Ortner's symptoms are negative.

The pancreas is not palpated, пальпация in its area also is painless. The spleen is palpated, its palpation is painless. The longitudinal size of a spleen – 9 cm.

Urination is not disoredered. Urination is free, painless. Urine is dark. At survey of kidneys area no pathological changes are revealed. Painfulness at palpation in the kidneys and ureters areas is absent. At receipt in GKB no. 54 there were painfulness morbidity at percussion of the kidneys area on the right.

Blood analysis (norm): erythrocytes – 3.2 mln/μL (3.4-5.0); Hb – 98 g/L (120-160); leukocytes – 15.8×109 /L (3.2-10.2); eosinophils - 5% (0.5- 5%); neutrophils: bands – 8% (1-6%), segmentated – 57% (47-72%); lymphocytes – 32% (19-37%); monocytes – 10% (3-11%); colour index – 1.0 (0.85-1.05); platelets – 51 (40-60); ESR – 35 mm/h(2-20).

*Data of laboratory and instrumental tests:*

**21.1.** (Test no. 1).

*Day 1.* Blood analysis: Hb – 137 g/L (120-160); erythrocytes – 4.38×109 /L (3.4-5.0); leukocytes – 8.8×109 /L (3.2-10.2); bands - 1% (1-6); segmentated- 65% (47-72); eosinophils - 3% (0.5-5); lymphocytes - 21% (19-37); monocytes - 10% (3-11); ESR - 18 mm/h (2-20).

*Day 7.* Blood analysis: Hb - 136 g/L (120-160); erythrocytes – 4.30×109 /L (3.4-5.0); leukocytes – 7.5×109 /L (3.2-10.2); bands - 3% (1-6); segmentat-

ed- 62% (47-72); eosinophils - 4% (0.5-5); lymphocytes - 22% (19-37); mono-cytes - 9% (3-11); ESR - 15 mm/h (2-20).

*Day 14.* Blood analysis: Hb - 138 g/L (120-160); erythrocytes – 4.32×109 /L (3.4-5.0); leukocytes – 6.7×109 /L (3.2-10.2); bands - 2% (1-6); segmentated - 61% (47-72); eosinophils - 5% (0.5-5); lymphocytes - 25% (19-37); monocytes - 7% (3-11); ESR - 13 mm/h (2-20).

**21.2.** (Test no. 2).

*Day 1.* (norm) Chemical blood analysis: unconjugated bilirubin - 72 μmol/L (2.57); conjugated bilirubin - 97 μmol /L (8.6); AST - 184 un/L (8-40); ALT - 285 un/L (5-30).

*Day 7.* (norm) Chemical blood analysis: unconjugated bilirubin - 52 μmol /L (2.57); conjugated bilirubin - 77 μmol /L (8.6); AST - 150 un /L (8-40); ALT - 200 un /L (5-30).

*Day 14.* (norm) Chemical blood analysis: unconjugated bilirubin - 33 μmol /L (2.57); conjugated bilirubin - 50 μmol /L (8.6); AST - 140 un /L (8-40); ALT - 180 un /L (5-30).

**21.3.** (Test no. 3).

*Day 1.* Urine analysis: colour - dark-yellow (straw-colored); enviroment-acid; transparency – not full / muddy (transparent); protein – 0.270 % (0.025-0.070); leukocytes - 1- 2 in visual field (1-2 in visual field); erythrocytes - 1 –3 in visual field (0-1 in visual field); blennuria – few.

*Day 7.* Urine analysis: colour - dark -yellow (straw-colored); enviro-ment- acid; transparency – full (transparent); protein – 0.110 % (0.025-0.070); leukocytes - 1- 2 in visual field (1-2 in visual field); erythrocytes - 1 –3 in visu-al field (0-1 in visual field); blennuria – few

*Day 14.* Urine analysis: colour - dark -yellow (straw-colored); enviroment - acid; transparency – full (transparent); protein – 0.110 % (0.025-0.070); leukocytes - 0-1 in visual field (1-2 in visual field); erythrocytes - 1 –3 in visual field (0-1 in visual field); blennuria – neg.

**22. Healf-improving boarding house "Mercy".**

Patient Anisimova E.P.

Card number – 1111. Room number – 27. Ward – 8.

Age: 68 years

Sex: female

Address: Moscow, the Frunze quay, 4

Date of the reference to the doctor: 1.03.2001

Discharge date: 23.03.2001.

Referral diagnosis: —

Clinical diagnosis: Parkinson's disease

Complications: no.

Coexisting diseases: acute bronchitis

General inspection.

A condition is satisfactory. A constitution is normosthenic. Temperature is 36,9°C.

Integuments and visible mucous are pure, pink. Hypodermic fatty tissue is moderately developed, visible hypostasesa are absent.

Lymph nodes are not palpated. Muscular and skeleton-articulate system are without any pathology.

Cardiovascular system: BP 110/70 mm Hg on both hands. Pulse on both hands — 76 beats/min. At percussion — borders of heart are within norm, at auscultation – the tones are clear, noises are absent.

Respiratory system: Nasal breathing is free, at percussion – the sound is clear, pulmonary, the bottom border of lungs within norm, at auscultation – the respiration is vesicular, rales are absent.

Digestive system: a teeth is sanified, the tongue and a pharynx are pure, dispepsic phenomena are absent, the stool is regular.

Urination system: urination is free, painless, Pasternatsky symptom is negative.

Volume of active and passive movements in the top and bottom limbs is full, movements are not accompanied by pain. Muscle tone of the top and bottom limbs is increased by extrapyramidal type (plastic), the micrography, tripping gait. Muscle force of the top and bottom limbs – 4 points. Radial, bicepses, triceps, knee, achill and live abdomen reflexes are summetric. Pathological hands and feet reflexes are absent. An akinesia is observed, namely bradykinesia, hypomimia, bradiologia, disprosodia, rare blinking. Acheiricynesis is expressed in small degree.

The higher brain functions:

The speech disorders and apraxia are not revealed. Accounting, reading and memory are without deviations. Hallucinations and fears are absent. Orientation in space and time is the full. Criticism to the condition within norm. At definition of right and left-hand side no pathology was revealed. There is moderately expressed depression, excitation is absent.

*Data of laboratory and instrumental tests:*

**22.1.** (Test no. 1).

*Day 1.* Blood analysis (norm): erythrocytes – 3.3 mln/µL (3.4-5.0); Hb – 115 g/L (120-160); leukocytes – 15.8×109 /L (3.2-10.2); eosinophils - 5% (0.5-5); neutrophils: bands – 8% (1-6), segmentated – 57% (47-72); lymphocytes – 32% (19-37); monocytes – 10% (3-11); colour index – 1.0 (0.85-1.05); platelets– 254×109 /L (180-360); ESR – 35 mm/h(2-20).

*Day 3.* Blood analysis (norm): erythrocytes – 3.8 mln/µL (3.4-5.0); Hb – 116 g/L (120-160); leukocytes – 13.8×109 /L (3.2-10.2); eosinophils - 4% (0.5-5); neutrophils: bands – 7% (1-6), segmentated – 50% (47-72); lymphocytes – 30% (19-37); monocytes – 9% (3-11); colour index – 1.0 (0.85-1.05); platelets– 252×109 /L (180-360); ESR – 30 mm/h(2-20).

*Day 7.* Blood analysis (norm): erythrocytes – 3.9 mln/µL (3.4-5.0); Hb – 118 g/L (120-160); leukocytes – 8.8×109 /L (3.2-10.2); eosinophils - 5% (0.5-5); neutrophils: bands – 6% (1-6), segmentated – 47% (47-72); lymphocytes –

31% (19-37); monocytes – 11% (3-11); colour index – 1.0 (0.85-1.05); plate-lets– 250×109 /L (180-360); ESR – 24 mm/h(2-20).

**22.2.** (Test no. 2).

*Day 1*. Urine analysis (norm): colour - gold-yellow (straw-colored); transparency – transparent (transparent); weight 1.011 (1.008-1.024); protein – neg. (0.025-0.070); glucose – neg. (neg); leukocytes – 8-10 in visual field (1-2 in visual field); epithelium plane – 6-8 in visual field (0-3 in visual field)

*Day 3*. Urine analysis (norm): colour - gold -yellow (straw-colored); transparency – transparent (transparent); weight 1.012 (1.008-1.024); protein – отр. (0.025-0.070); glucose – neg. (neg); leukocytes – 5-7 in visual field (1-2 in visual field); epithelium plane – 4-5 in visual field (0-3 in visual field)

*Day 7*. Urine analysis (norm): colour - gold -yellow (straw-colored); transparency – transparent (transparent); weight 1.010 (1.008-1.024); protein – отр. (0.025-0.070); glucose – neg. (neg); leukocytes – 1-3 in visual field (1-2 in visual field); epithelium plane – 0-2 in visual field (0-3 in visual field)

**22.3.** (No. 3). *Changing of parameters of objective inspection:*

*9.06.98*. Pulse- 80 beats/min. RR-18 /min. Temperature 38.0°C. BP-130/90 mm Hg

*10.06.98*. Pulse-77 beats/min. RR-20 /min. Temperature 37.5°C. BP 130/90 mm Hg.

*11.06.98*. Pulse-64 beats/min. RR-16 /min. Temperature 37.1°C. BP110/80 mm Hg.

*12.06.98*. Pulse-66 beats/min. RR-15 /min. Temperature 37.0°C. BP120/75 mm Hg.

*13.06.98*. Pulse-62 beats/min. RR-16 /min. Temperature 36.8°C. BP115/65 mm Hg.

*14.06.98*. Pulse-64 beats/min. RR-18 /min. Temperature 36.6°C. BP125/85 mm Hg.

## 1.2. DATABASE FORMATTING ON THE BASIS OF THE CARD OF THE INPATIENT LEAVING A HOSPITAL BY USING ELECTRON BOOKS MICROSOFT EXCEL

QUESTIONS: (The teaching process is aimed at the formation the following skills for students: general cultural skills 1, 5; general professional skills 1, 7; professional skills 21.)

1. Can I add new data to the created chart and how?

2. How can you fix on the screen the headings of the graph table?

3. How can you set the print headings count on each page?

4. How can you enter a note in a table cell?

5. What data tables need to be selected to sort them?

6. By how many nested keys is it possible to simultaneously sort the data?

7. How can you set names for a range of cells based on the headers of the top row and the left column?

EXAMPLE. Consider the pattern of a leaving inpatient's card in the appendix. It's necessary to create a database on the basis of such card.

1. Launch Microsoft Excel.

2. In the ell A1 input the title of the base: «Card of leaving inpatient». Select the title by the mouse and change the font size to 16 pt, select Bold style by clicking the left mouse button on the corresponding icon in the Standard panel.

3. Input subsequently to cells A3-AB3 the text:

A3 —Full name, B3 — Address, C3 — Age, D3 — Sex, E3 — Referred by;

F3 — Diagnosis of referring inst., G3 — Date of admission;

H3 — Date of discharge;

I3 — Outcome of the disease, J3 — Days spent, K3 — Dynamics of disease;

L3 — Hospital diagnosis (code), M3 — Main diagnosis, N3 — Complications;

O3 — Coexisting diseases, P3 — Quantity of operations, Q3 — Date of operation;

R3 — Name of operation, S3 — Complication of operation;

T3 — Type of narcosis, U3 — Pathoanatomic diagnosis, V3 — Coincidence;

W3 — Doctor in charge, X3 — Hospital, Y3 — Department;

Z3 — Ward no.;

AA3 — No. department, AB3 — Card no.

4. Change the font size in cell A3-AB3. For this select the text in the cell, then select the font size 8.

5. Change the width of cells A3-AB3, so that there is room for the all words. Make sure that there is a room for the all words of the text. If some words are longer than the cell width, increase the width by the way mentioned above.

6. In cell I3 "Outcome of the disease" input the comment: discharged, dead, moved. Make sure that the frame is in cell I3. Then select in Main menu command *Рецензии - Создать примечание*. The frame with a cursor will appear in the screen. Input the text of the comment into the position of the cursor:

> Discharged
> Dead
> Moved

The text is connected with cell after clicking the left mouse button at the blank area of the sheet. Each cell with a comment is indicated by a small red triangle in the top right corner. In cell K3 "Dynamics of disease" and V3 "Coincidence" input the following comment text:

> Recover
> Improvement
> Unchanged
> Worsening

> Yes
> No

In the cells of the column marking the days spent in a hospital, apply subsequently the sum function for automatic calculation of days spent in a hospital. For this put the cursor into cell J4. Then apply click *Insert Function* button $f_x$ in the *Formula ba*r $f_x$. In *«Категория»* list select item *«Да-та_время»*. It the list of functions select function *«ДНЕЙ360»*, which calculates the number of days between the two dates. Press key Enter. Press key *«Ok»*. After filling the table, the quantity of days spent in a hospital will be calculated automatically in cell J4.

Do the same in cells J5 and J6.

Do the automatic calculation of the average quantity of days spent in the hospital. For this click the first empty cell of column J and apply *click Insert Function* button $f_x$ in the *Formula bar* $f_x$. Select *«Статистические»* in *«Категория»* line, select function *СРЗНАЧ* and click *«Ok»*. Specify the array of the numbers, which average value need to be calculated, in the opening dialog box. For this select those sells by mouse, that contains numbers of days spent in a hospital. Clicking *«Ok»* button, make sure that there is an average value of days spent by patients in a hospital in the cell.

## TASK 1.2.

Formatting of database on the basis of the case record by using electron workbook Microsoft Excel. Task numbers in the TABLE VARIANTS id. number corresponds to the numbers of the CASE RECORDS, which should be used at the database creating.  Form a database according to EXAMPLE on the basis of the corresponding case records and save all results in a single file.

# PART 2. EXCEL FOR STATISTICS

Data sets are the results of observations or experiments. Its analysis is done by using of mathematical statistics. Correlation analysis is an imporktant part of statistical analysis that used for revelation of interconnections between stistical samples. To investigate the revealed interconnections the regression analysis is used. Excel gives an opportunity to data processing and solving mathematical problems. Formulae and functions are the base of processor Microsoft Excel.

*QUESTIONS* (The process of teaching at the department is aimed at forming the following competencies for students: professional skills 1, 7; professional skills 21.).

1. How can you set an arbitrary name for a specific region?

2. How can you replace the cell addresses in the formula with their names?

3. Can cell names be used when writing a formula?

4. What is the difference in the use of the functions: СЧЕТ и СЧЕТЗ

5. How to specify a range of cells indicated for function СРЗНАЧ?

6. How can you set absolute links in a range of cells?

7. How can you insert (delete, rename) a worksheet in a book?

8. How can you select all sheets of the workbook?

9. How can you ungroup workbook sheets?

10. How can you set a link from one worksheet to another sheet of the current file or to a table from another file?

## 2.1. RANDOM SAMPLE: MATHEMATICAL DESCRIPTION

*Mathematical statistics* is the branch of science dealing with tools of gathering, analysis and processing of statistical data.

The whole set of objects of observation is named general population.

*A random sample* is a randomly selected subset of a population. The number of objects in a sample is named sample volume.

Let the random sample has been extracted from the population, and value x1 has been observed n1 times, $x_2 - n_2$ times, $x_k - n_k$ times and $\Sigma n_i = n$ is the sample volume. The observable values $x_i$ is named *variants*, and the sequence of variant given in an increasing order is called *ordered sample*. The quantity of observations $n_i$ of variant $x_i$ is named absolute *frequency*, and frequencies divided by the volume sample $n_i/n$ are called *relative frequencies*.

*Statistical distribution* is a list of variants and their absolute or relative frequencies.

Random value *X* is observed in a number of independent experiments, and statistical distribution of some qualitative attribute of *X* is formed. To have a clear view of random value *X* distribution, the distribution function is built.

*Distribution function* is a function $F^*(x)$, which for each value x defines the relative frequency of that the random variable *X* takes on a value less than or equal to *x*. To build a distribution function, the whole change range of random value *X* should be divided into a number of intervals of equal widths. The number of *X* values in each interval (absolute frequency) is determined then. By dividing these numbers on the number of observations n, relative frequencies of that *X* lies in the intervals are obtained. Histogram of relative frequencies is built on the basis of calculated relative frequencies. The straight polyline connecting corresponding points of relative frequencies is called a polygon of frequencies.

*Polygon of frequencies* is a straight polyline, which intervals connect dots $(x_1; n_1)$, $(x_2; n_2),\ldots,(x_k; n_k)$. In order to build a polygon of frequencies, variants $x_i$ are put on the abscesses axis and corresponding frequencies are put on the ordinate axis. The dots $(x_i; n_i)$ are connected by segments of straight lines, thus the polygon of frequencies is obtained. If one put relative frequencies instead of absolute ones on the ordinates axis, he will obtain a polygon of relative frequencies.

*Histogram of frequencies* is a step-like figure, which consists from rectangles. The bases of the rectangles are partial intervals $\Delta x$, their heights are equal to frequency densities $n_i/\Delta x$. If the heights are equal to the ratio of relative frequencies to the lengths of partial intervals $\Delta x$, then the histogram is called the histogram of relative frequencies.

At increasing the sample volume to infinity empirical function of distribution becomes a theoretical function of distribution and histogram turns to a frequency distribution plot.

Special function FREQUENCY and procedure Histogram from the Data Analysis Tools are used for plotting empirical function of distribution in Excel.

Function FREQUENCY calculates the frequencies of appearance of a random value in the intervals and draws them as an array of numbers.

Procedure Histogram is used for calculation of sample and integral frequencies of data appearance in the pointed intervals of values. The procedure draws the results in the form of table and histogram.

EXAMPLE. Build an empirical distribution of the following sample: 24, 27, 23, 22, 25, 24, 27, 21, 20, 29, 23, 21, 26, 25, 23, 22, 25, 26, 23, 29.

SOLUTION.

1. In cell A1 input word «Observations», and in range A2:B11 input the sample values.

2. Select the interval width equal to 1. Then in will be 9 intervals at outside values 20 and 29. In cell C1 input letter *«X»*. In range C2:C10 input boundary values of the intervals (20, 21, 22, 23, 24, 25, 26, 27, 29).

3. Input the titles «Absolute frequencies» in cell D1, «Relative frequencies» in call E1 and «Accumulated frequencies» in cell F1. Distribute columns evenly so that all the input titles will be visible. For this bring the mouse cursor at the boundary between the titles of the columns. After appearance of a doubled arrow ($\leftrightarrow$) press left mouse button and move it at necessary distance keeping it pressed.

4. Fill the column of the absolute frequencies. Select cells D2:D10 by using mouse. Call *Вставка функции* (icon $f_x$), select *Statistical* category and function **ЧАСТОТА** and click *«Ok»*. The dialog box ЧАСТОТА will appear: Input the data range (A2:B11) into field *«Массив_данных»* by using the

mouse. Into field *«Массив_интервалов»* input range of intervals (C2:C10). After that press key combination *<Ctrl>+<Shift>+<Enter>*. An array of the absolute frequencies will appear in column D2:D10.

5. Find the sample volume in cell D11. Set the cursor into cell D11, click icon *«АвтоСумма»* (∑), select the region for the sum (D2:D10) and press key *<Enter>*.

6. Fill the column of the relative frequencies. In the cell E2 input the formula for calculation of a relative frequency: =D2/D$11. Press key *<Enter>*. Copy the formulae into range E3:E10 by dragging with the mouse. We'll obtain the relative frequencies.

7. Fill the column of the accumulated frequencies. Enter the relative frequency from cell E2 into cell F2. Input formula F3:= F2+E3 into the cell. Press button *<Enter>*. Copy the formulae into range F4:F10 by dragging with the mouse. We'll obtain the accumulated frequencies.

8. Results of calculation of relative and accumulated frequencies are shown in the figure.

Let's build a chart for relative and absolute frequencies. Click icon «*Ma-стер диаграмм*» (🏛) in the standard menu. Select sheet *«Custom Types»* and type *«Line – Column on 2 Axes»*. Then click item «Next» and input range E2:F10 by using the mouse. The chart will look like follows:
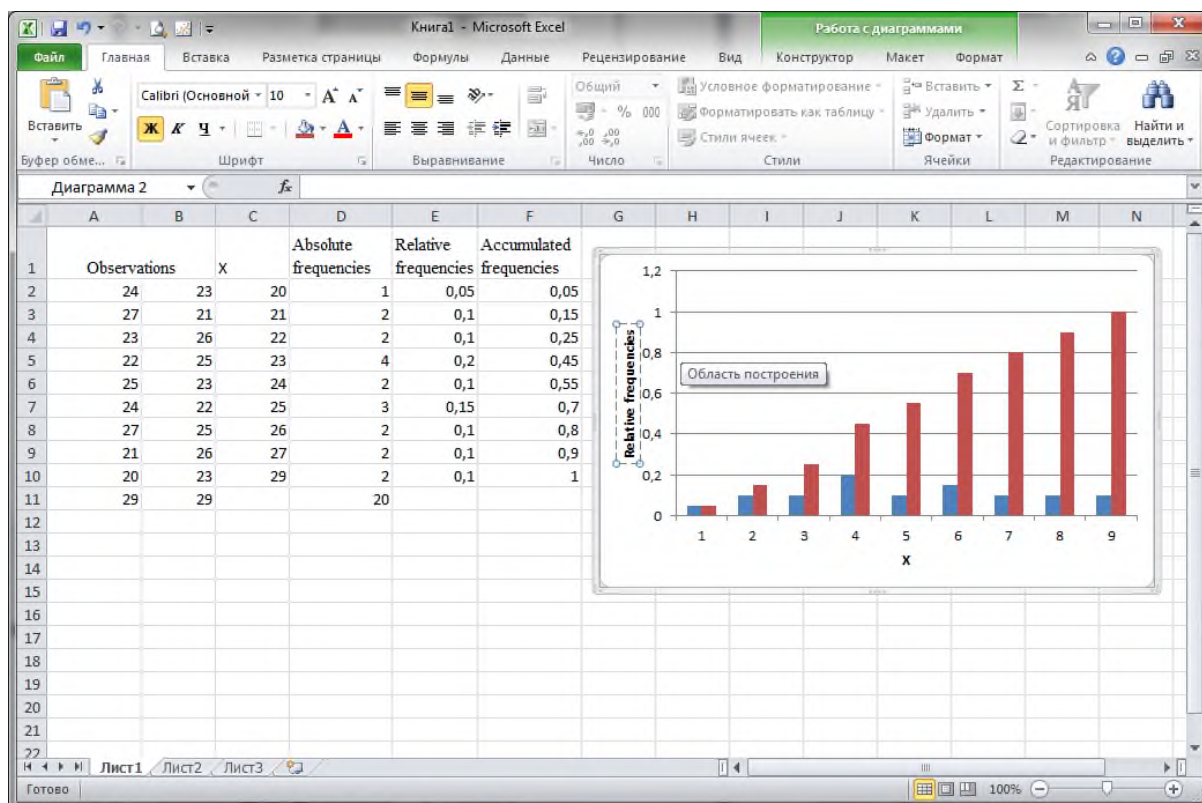


## TASK 2.1.

The teaching process is aimed at the formation the following skills for students: general professional skills 1, 7; professional skills 21.

Use an Excel spreadsheet processor and perform statistical data processing. Make a conclusion on the calculations.

**Build an empirical distribution of the following sample:**

**1.** 23, 25,24,22,21,26,27,23,25,24,24,23,27,27,26,24,25,23,25,23.

**2.** 32,33,34,32,34,31,35,36,34,33,32,35,32,31,33,32,34,35,34,32.

**3.** 15,13,12,15,17,16,15,14,13,12,16,15,15,17,16,15,13,16,13,12.

**4.** 43,45,46,47,45,42,43,44,45,46,41,43,46,43,48,47,46,43,45,44.

**5.** 54,53,53,54,56,55,57,52,53,54,51,56,54,53,56,54,53,56,57,53.

**6.** 65,66,67,62,63,67,68,65,67,66,61,64,63,64,67,68,65,64,63,65.

**7.** 76,77,78,79,75,75,76,73,73,74,75,78,76,75,76,74,74,73,73,78.

**8.** 88,89,86,87,85,84,83,83,87,88,86,87,86,84,85,86,83,81,82,82.

**9.** 98,99,96,95,96,93,92,94,93,95,96,97,94,92,91,04,93,92,96,97.

**10.** 101,102,108,107,105,104,104,103,103,106,104,102,107,105, 104, 103, 103,106,105,107.

**11.** 53, 55,54,52,51,56,57,53,55,54,54,53,57,57,56,54,55,53,55,53.

**12.** 42,43,44,42,44,41,45,46,44,43,42,45,42,41,43,42,44,45,44,42.

**13.** 65,63,62,65,67,66,65,64,63,62,66,65,65,67,66,65,63,66,63,62.

**14.** 83,85,86,87,85,82,83,84,85,86,81,83,86,83,88,87,86,83,85,84.

**15.** 94,93,93,94,96,95,97,92,93,94,91,96,94,93,96,94,93,96,97,93.

**16.** 35,36,37,32,33,37,38,35,37,36,31,34,33,34,37,38,35,34,33,35.

**17.** 46,47,48,49,45,45,46,43,43,44,45,48,46,45,46,44,44,43,43,48.

**18.** 78,79,76,77,75,74,73,73,77,78,76,77,76,74,75,76,73,71,72,72.

**19.** 88,89,86,85,86,83,82,84,83,85,86,87,84,82,81,84,83,82,86,87.

**20.** 301,302,308,307,305,304,304,303,303,306,304,302,307,305, 304, 303, 303,306,305,307.

**21.** 43, 45,44,42,41,46,47,43,45,44,44,43,47,47,46,44,45,43,45,43.

**22.** 52,53,54,52,54,51,55,56,54,53,52,55,52,51,53,52,54,55,54,52.

**23.** 25,23,22,25,27,26,25,24,23,22,26,25,25,27,26,25,23,26,23,22.

**24.** 73,75,76,77,75,72,73,74,75,76,71,73,76,73,78,77,76,73,75,74.

**25.** 44,43,43,44,46,45,47,42,43,44,41,46,44,43,46,44,43,46,47,43.

**26.** 75,76,77,72,73,77,78,75,77,76,71,74,73,74,77,78,75,74,73,75.

**27.** 86,87,88,89,85,85,86,83,83,84,85,88,86,85,86,84,84,83,83,88.

**28.** 98,99,96,97,95,94,93,93,97,98,96,97,96,94,95,96,93,91,92,92.

**29.** 68,69,66,65,66,63,62,64,63,65,66,67,64,62,61,64,63,62,66,67.

**30.** 201,202,208,207,205,204,204,203,203,206,204,202,207,205, 204,203, 203,206,205,207.

## 2.2. CORRELATION ANALYSIS

One of the most widespread problems of statistical research is study of connection between some observable variables. Knowledge of mutual connections gives an opportunity to predict the development of a situation when changing the attributes of an examined object.

Correlation analysis consists of definition of a power of connection between two random values X and Y. Coefficient of correlation is used as a measure of such connection. Coefficient of correlation of two independent random values is equal to zero. Coefficient of correlation of two random values that are connected by function is equal to 1 in the case of increasing correlation and equal to $-1$ in the case of decreasing correlation.

*Sample coefficient* of a linear correlation between two random values X and Y is calculated by the formula

$$r = \frac{\sum n_{xy} xy - n \bar{x} \bar{y}}{n \sigma_x \sigma_y}$$

where *x, y* are the values of attributes *X* and *Y*; $n_{xy}$ is a frequency of a pair values (*x, y*), *n* is a sample volume; $\sigma_x$, $\sigma_y$ are root-mean-square deviations, $\bar{x}, \bar{y}$ are sample means.

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}, \quad \bar{y} = \frac{\sum_{i=1}^{n} y_i}{n}, \quad \bar{x}^2 = \frac{\sum_{i=1}^{n} x^2}{n}, \quad \bar{y}^2 = \frac{\sum_{i=1}^{n} y^2}{n},$$

$$\sigma_x^2 = \bar{x}^2 - (\bar{x})^2, \quad \sigma_y^2 = \bar{y}^2 - (\bar{y})^2.$$

After calculation of a sample correlation coefficient, let's verify a hypothesis about significance of linear correlation dependence between the observable values in the general population, namely a hypothesis about significance of a sample correlation coefficient. The experimental value of test statistic should be calculated:

$$t_{\exp} = \frac{r \sqrt{n-2}}{\sqrt{1-r^2}}.$$

The critical value $t_{cr}$ is determined from the table of critical values of two-sided critical range of Student's T–Distribution at given significance level $\alpha$ and $f = n - 2$ degrees of freedom. In Excel tcr can be calculated by the command TINV($\alpha$, f).

If $\left|t_{\exp}\right| > t_{cr}$, then we accept the hypothesis about significance of sample correlation coefficient at given significance level. Otherwise the hypothesis is rejected.

In Excel special function КОРЕЛJI (array 1; array 2) is used for calculation of a linear correlation coefficient, where array 1 is a range of values of the first random value, array 2 is a range of values of the second random value.

EXAMPLE. A dependence between the systolic pressure $\overline{Y}$ (mmHG) and the age (years) of men at the initial stage of a shock was investigated. The results of observations are shown in the table. It is necessary to define if there is dependence between the systolic pressure and the age.

| X | $\overline{Y}$ |
|---|---|
| 68 | 114 |
| 37 | 149 |
| 50 | 146 |
| 53 | 141 |
| 75 | 114 |
| 66 | 112 |
| 52 | 124 |
| 65 | 105 |
| 74 | 141 |
| 65 | 120 |

SOLUTION.

Create new workbook in Excel. Input «*Age*» into cell A1 and corresponding values into cells A2:A11. Input "Systolic pressure" into cell B1 and corresponding values in cell B1:B11. Then the value of the sample correlation coefficient is calculated. Put the cursor in a free cell (A12) and click icon «*Insert function*» (*fx*). Select statistical category and after select function CORREL.
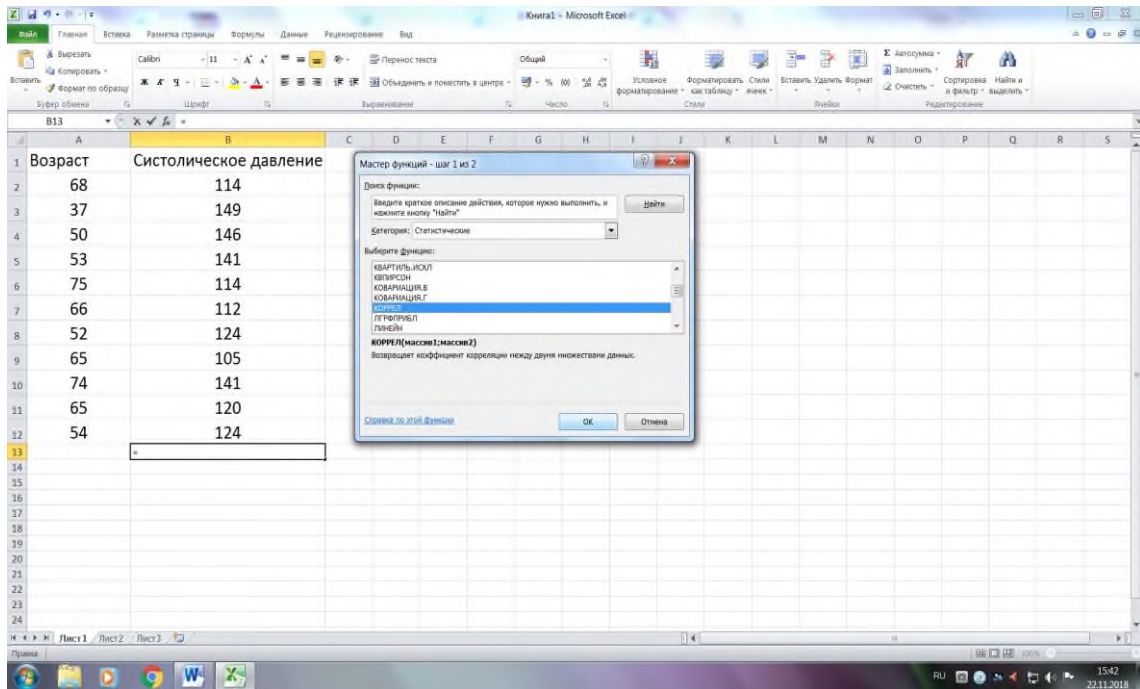
The dialog box КОРЕЛЛ will appear. Using the mouse, input data range «Age» (A2:A11) into the field *«Array 1»* and data range «Systolic pressure» (B2:B11) into the field *«Array 2»*.
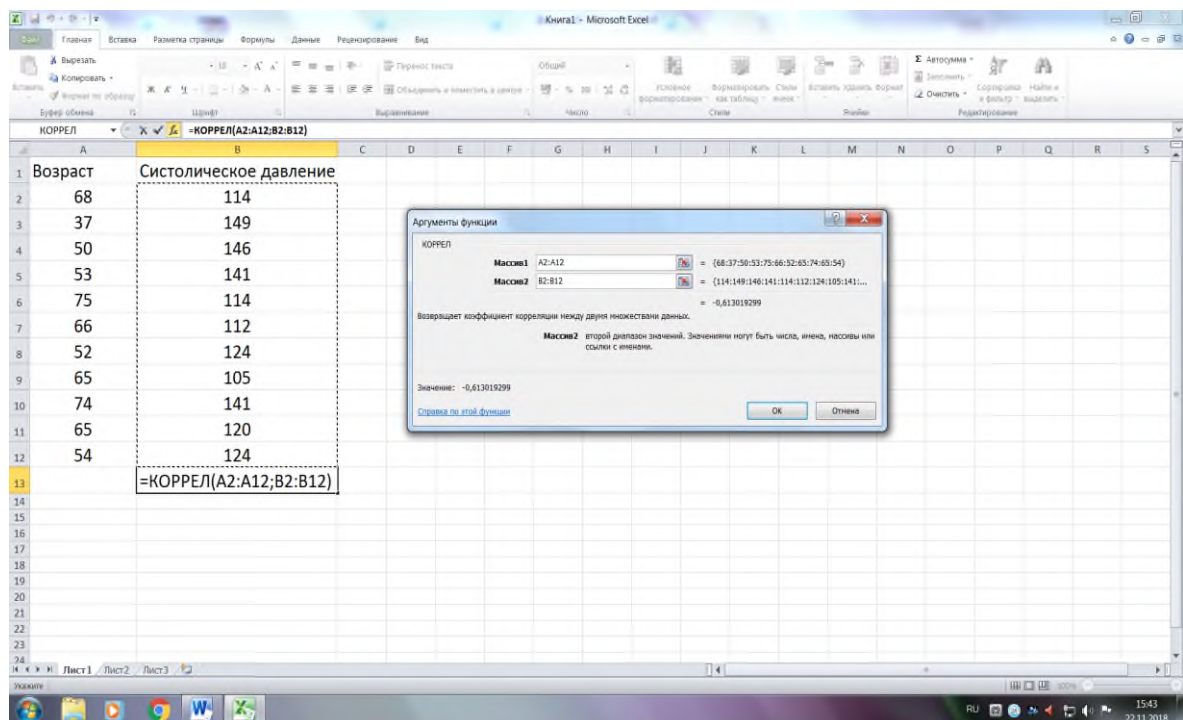


The value of the correlation coefficient r= – 0.6315 will appear in cell A12 after clicking "Ok". To verify the significance of the correlation coefficient between variables X и $\overline{Y}$ let's calculate the test statistics $t_{cr}$ and the criti-

cal value $t_{cr}$ at the significance level α=0.05 (at n=10, $t_{cr}$=2.3). The sample volume $n=10$, so the number of degrees of freedom $f=10-2=8$.

## TASK 2.2.

The teaching process is aimed at the formation the following skills for students: general professional skills 1, 7; professional skills 21.

**The results of several independent observations of a system of random values (x, y) are given. Find the sample correlation coefficient and verify a significance of cirrelational connection at significance level α=0,05.**

**1.** (2;3),(2,4;4),(3,4;5),(3,2;3),(4,3;5),(3,1;3),(3,3;5),(2,4;5),(4,2;1),(3,2;5)

**2.** (1;3),(2,3;6),(5,4;5),(4,2;3),(5,3;5),(4,1;3),(2,3;5),(6,4;5),(3,2;1),(4,2;5)

**3.** (5;3),(2,7;6),(6,4;5),(6,2;3),(7,3;5),(5,1;3),(4,3;5),(7,4;5),(6,2;1),(6,2;5)

**4.** (4;3),(7,7;6),(5,4;5),(8,2;3),(6,3;5),(7,1;3),(6,3;5),(5,4;5),(4,2;1),(7,2;5)

**5.** (4;3),(3,7;6),(7,4;4),(6,2;3),(5,3;5),(4,1;3),(7,3;5),(6,4;5),(5,2;1),(5,2;5)

**6.** (4;3),(3,7;6),(7,4;4),(6,2;3),(5,3;5),(4,1;3),(7,3;5),(6,4;5),(5,2;1),(5,2;5)

**7.** (5;3),(4,7;6),(6,4;4),(5,2;3),(4,3;5),(5,1;3),(4,3;5),(7,4;5),(6,2;1),(6,2;5)

**8.** (6;3),(7,7;6),(5,4;4),(4,2;3),(5,3;5),(5,1;3),(4,3;5),(7,4;5),(6,2;1),(6,2;5)

**9.** (5;3),(6,7;6),(4,3;4),(6,2;3),(6,3;5),(4,1;3),(3,3;5),(5,4;5),(4,2;1),(3,2;5)

**10.** (4;3),(6,7;6),(3,3;4),(5,2;3),(4,3;5),(5,1;3),(4,3;5),(6,4;5),(4,2;1),(6,2;5)

**11.** (3;3),(3,4;4),(2,4;5),(2,2;3),(3,3;5),(2,1;3),(4,3;5),(4,4;5),(2,2;1),(2,2;5)

**12.** (2;3),(5,3;6),(4,4;5),(3,2;3),(4,3;5),(3,1;3),(4,3;5),(5,4;5),(2,2;1),(4,2;5)

**13.** (4;3),(4,7;6),(5,4;5),(4,2;3),(6,3;5),(3,1;3),(4,3;5),(6,4;5),(3,2;1),(4,2;5)

**14.** (2;3),(6,7;6),(4,4;5),(3,2;3),(5,3;5),(2,1;3),(4,3;5),(4,4;5),(2,2;1),(5,2;5)

**15.** (2;3),(5,7;6),(5,4;4),(2,2;3),(4,3;5),(3,1;3),(6,3;5),(4,4;5),(2,2;1),(3,2;5)

**16.** (2;3),(5,7;6),(5,4;4),(2,2;3),(4,3;5),(3,1;3),(6,3;5),(4,4;5),(2,2;1),(4,2;5)

**17.** (4;3),(5,7;6),(5,4;4),(4,2;3),(5,3;5),(4,1;3),(5,3;5),(6,4;5),(2,2;1),(5,2;5)

**18.** (2;3),(5,7;6),(5,4;4),(3,2;3),(4,3;5),(3,1;3),(6,3;5),(5,4;5),(3,2;1),(4,2;5)

**19.** (4;3),(5,7;6),(3,3;4),(4,2;3),(5,3;5),(3,1;3),(4,3;5),(4,4;5),(2,2;1),(4,2;5)

**20.** (3;4),(5,7;6),(4,3;4),(4,2;3),(3,3;5),(4,1;3),(3,3;5),(5,4;5),(2,2;1),(5,2;5)

**21.** (4;3),(3,4;4),(4,4;5),(2,2;3),(3,3;5),(2,1;3),(4,3;5),(4,4;5),(2,2;1),(4,2;5)

**22.** (2;1),(5,3;6),(4,4;5),(3,2;3),(4,3;5),(3,1;3),(4,3;5),(5,4;5),(2,2;1),(6,2;5)

**23.** (4;3),(5,7;6),(4,4;5),(5,2;3),(6,3;5),(3,1;3),(4,3;5),(5,4;5),(2,2;1),(5,2;5)

**24.** (3;3),(6,7;6),(6,4;5),(3,2;3),(4,3;5),(3,1;3),(5,3;5),(4,4;5),(2,2;1),(6,2;5)

**25.** (2;3),(5,7;6),(5,4;4),(3,2;3),(4,3;5),(3,1;3),(5,3;5),(5,4;5),(4,2;1),(4,2;5)

**26.** (5;3),(5,7;6),(6,4;4),(3,2;3),(4,3;5),(3,1;3),(6,3;5),(5,4;5),(3,2;1),(4,2;5)

**27.** (4;5),(5,7;6),(5,4;4),(4,2;3),(5,3;5),(4,1;3),(3,3;5),(6,4;5),(3,2;1),(4,2;5)

**28.** (5;3),(6,7;6),(6,4;4),(3,2;3),(4,3;5),(4,1;3),(3,3;5),(4,4;5),(3,2;1),(4,2;5)

**29.** (6;4),(5,7;6),(5,3;4),(5,2;3),(4,3;5),(3,1;3),(4,3;5),(4,4;5),(3,2;1),(4,2;5)

**30.** (4;6),(5,4;6),(2,3;4),(3,2;3),(3,3;5),(4,1;3),(3,3;5),(4,4;5),(3,2;1),(4,2;5)


## 2.3. REGRESSION ANALYSIS

Regression analysis is used for the modelling and analysis of casual relationships between numerical data consisting of values of a dependent variable Y (response variable) and of one or more independent variables (explanatory variables). Such dependence is usually defined by some mathematical model, namely the *regression equation*. The dependent variable in the *regression equation* is modelled as a function of the independent variables, containing some unknown parameters («constants») and an error term. The error term is treated as a *random variable*. It represents unexplained variation in the dependent variable. The parameters are estimated so as to give a «best fit» of the data. Most commonly the best fit is evaluated by using the least squares method, but other criteria have also been used.

Linear regression is a form of regression analysis in which the regression equation is a linear function is a linear combination of one or more model parameters, called regression coefficients. A linear regression equation with one independent variable represents a straight line.

The data consist of n values ($x_1$, $x_2$, ..., $x_n$) of the independent variable (regressor) X and n values ($y_1$, $y_2$, ... $y_n$) of the dependent variable *Y*. The sample linear regression equation can be written as

$$\overline{Y}_x = \rho_{yx} x + b \quad , (*)$$

where are $\rho_{yx}$ (slope) and b (intercept) are the unknown parameters of the model. Slope $\rho_{yx}$ is also called the sample coefficient of regression of *Y* at *X*.

An equivalent formulation of simple linear regression that explicitly shows the linear regression as a model of conditional expectation can be given as

$$E(y \mid x) = \rho_{yx} x + b.$$

The parameters $\rho_{yx}$ and b are estimated by using the least squares method, namely sum of squared deviations of ordinates of empirical points from ordinates of corresponding points on the straight line is minimized.

By using the least squares method, the following formulas for calculation $\rho_{yx}$ and b are obtained

$$\rho_{yx} = (\overline{XY} - \overline{X}\,\overline{Y})/\sigma_x^2 \quad ;$$

$$b = (\overline{X^2}\,\overline{Y} - \overline{X}\,\overline{XY})/\sigma_x^2 \quad ,$$

where
$$\overline{X} = \sum_{i=1}^{n} x_i / n \quad , \quad \overline{Y} = \sum_{i=1}^{n} y_i / n \quad ,$$

$$\overline{X}^2 = \sum_{i=1}^{n} x_i^2 / n \quad , \quad \overline{Y}^2 = \sum_{i=1}^{n} y_i^2 / n \quad ,$$

$$\overline{XY} = \sum_{i=1}^{n} x_i y_i / n \quad ,$$

$$\sigma_x^2 = \overline{X}^2 - (\overline{X})^2 \quad .$$

Linear regression analysis consists in finding a strait line plot and its equation on the basis of a set of observation.

Procedure *Regression* from the *Data Analysis Tools* is used for calculating the parameters of the equation. Besides, function ЛИНЕЙН can be used for obtaining of the parameters of a regression equation and function

ТЕНДЕНЦИЯ can be used for obtaining of the predicted values of Y in required points.

It necessary to apply command *Данные → Анализ данных* for realisation of procedure Regression.

Analysis output. Summary output range includes results of a dispersion analysis, regression coefficients, standard error of calculation of Y, root-mean-square deviations, number of observations and standard errors for coefficients.

The given value R-square (coefficient of determination) in regression statistics defines the degree of accuracy of approximation of initial data by the regression equation. If R-square > 0.95, there is a high accuracy of approximation. If R-square is in range 0.8-0.95, there is a sufficient approximation. If R-square < 0.6, the approximation accuracy isn't enough and the model requires improvement.

In table «ANOVA» a general quality of the obtained model is estimated, namely its validity at significance level of Fisher criterion P, which must be less than 0.05. Its value is defined in row Regression and column "Significance F".

Values of a model's coefficients are defined in column «Coefficients». Intercept b is given in row «Intercept» and slope $\rho yx$ is given in row «X Variable 1». In column «P-value» a validity of difference between the corresponding coefficients and zero is given. If P > 0,5, the coefficient may be taken equal to zero. But it doesn't mean that the corresponding independent variable doesn't influence the dependent variable, and the coefficient can't be removed from the equation.

EXAMPLE. The dependence between the volume Y ($\mu m^3$) and the diameter X ($\mu m$) of dry erythrocyte is investigated. The results of investigations are shown in the table:

| X | Y |
|---|---|
| 7.6 | 87 |
| 8.9 | 81 |
| 5.5 | 50 |
| 9.2 | 112 |
| 3.5 | 18 |
| 4.8 | 37 |
| 7.3 | 71 |
| 7.4 | 69 |
| 6.8 | 54 |

Make a regression equation on the basis of these data.

SOLUTION.

1. In menu *Данные* select *Анализ данных…* and select «*Регрессия*».
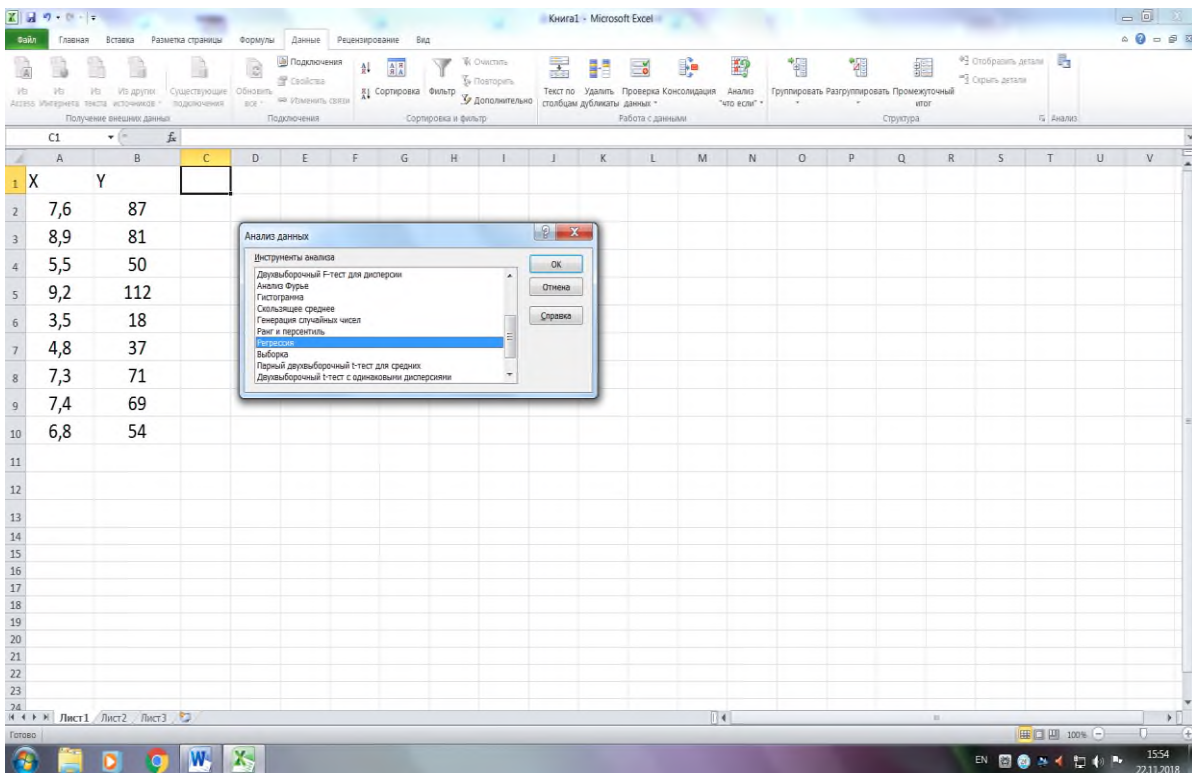


2. In the appeared dialog box specify «*Input Y range*». For this press left mouse button and drag the mouse cursor from the top cell of the column of dependent data to the bottom one, then leave left mouse button.

3. Specify «*Input X range*». For this it is necessary to press left mouse button, drag the mouse cursor from the top cell of the column of independent data to the bottom one and leave left mouse button.

4. Specify the output range. For this put the switch in «*Output Range*», then put the mouse cursor to the field in the right. By clicking left mouse button, put the mouse cursor in the left top cell of the output range (C1). The results output will begin from this cell. Click left mouse button. Click button «*Ok*».

5. If it is necessary to view the difference of the experimental points from the predicted by the regression model ones, one should select «*Line fit plot*» check box.

6. Click «*Ok*» button.
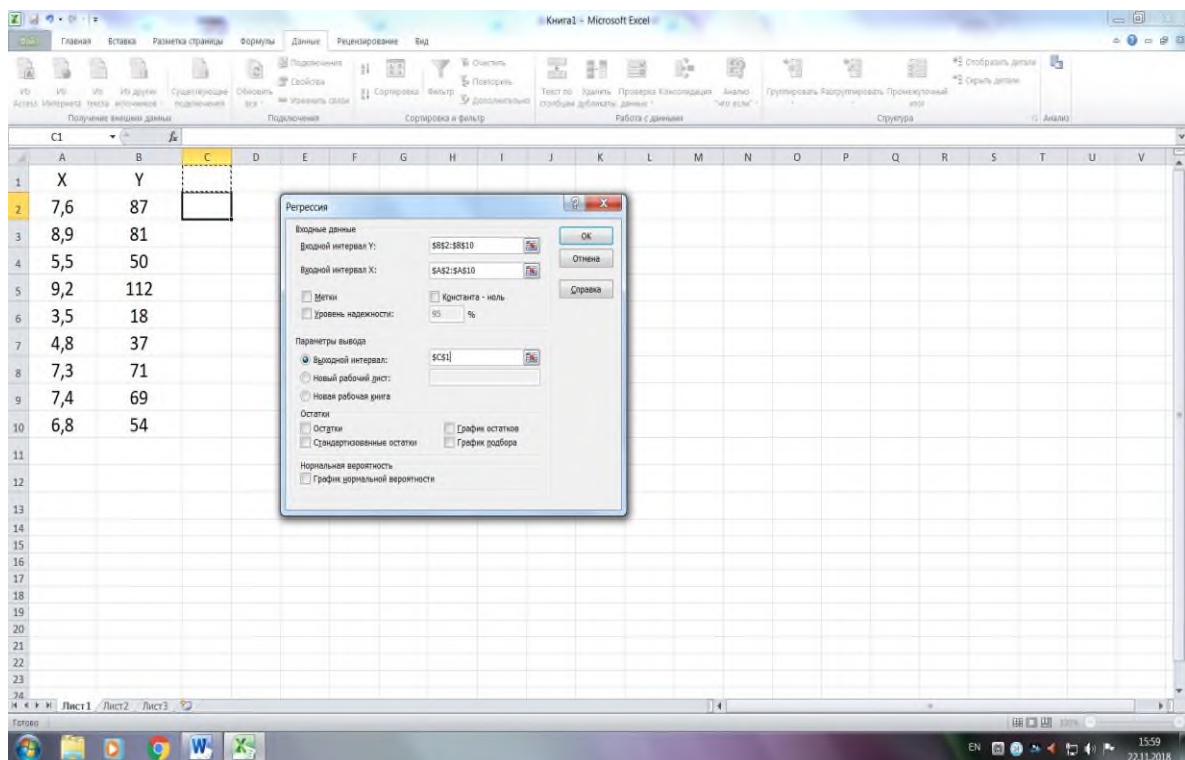


Analysis result. The following results and line fit plot will appear in the output range.

The value of R-square (determination coefficient) is given, which defines a degree of accuracy of the process description by the model. In the example R-square < 0.901418.. As R-square < 0.95, there isn't high accuracy of the approximation.

In ANOVA table the general quality of the obtained model is estimated. Its validity is verified by using a significance level Fisher criterion (statistics). On the intersection of row «Regression» and column «Significance F» the value 0.0000911 is given, thus

P = 0.0000911 and the model is valid, because P<0.05.

Let us define the model parameters. On the intersection of row «Intercept» with column «Coefficients» the intercept is given. On the intersection of row «X variable 1» with column «Coefficients» the slope is given. In our example b ≈ –32.48 and $\rho yx \approx 14.28$.

Thus, the regression equation (for definition of the dry erythrocyte volume from the diameter) will be as follows:

$$\bar{Y}x = 14.28X - 32.48$$

## TASK 2.3.

The teaching process is aimed at the formation the following skills for students: general professional skills 1, 7; professional skills 21.

**The results of several independent observations of a system of random values (x, y) are given. Build the equation of linear regression of Y on X.**

**1.** (1;2),(3;4),(2;3),(2;6),(4;5),(4;3),(3;4),(3;5),(4;5),(4;6)

**2.** (1;5),(3;6),(4;3),(3;6),(6;5),(6;3),(7;4),(5;5),(3;5),(3;6)

**3.** (4;5),(6;6),(5;3),(6;7),(5;6),(7;3),(6;4),(4;5),(6;7),(3;7)

**4.** (5;6),(7;6),(4;3),(5;7),(7;6),(3;3),(5;4),(4;5),(6;5),(3;5)

**5.** (3;4),(1;2),(3;2),(2;3),(3;4),(3;5),(2;3),(3;4),(5;4),(3;6)

**6.** (3;1),(1;3),(1;2),(2;1),(2;5),(2;5),(1;3),(4;5),(2;5),(2;1)

**7.** (3;1),(2;3),(4;2),(3;1),(4;5),(3;5),(4;3),(2;5),(1;5),(4;1)

**8.** (4;1),(4;3),(5;2),(6;1),(3;5),(4;5),(4;3),(5;5),(4;5),(3;1)

**9.** (5;1),(3;3),(6;2),(5;1),(5;5),(3;5),(5;3),(3;5),(3;5),(4;1)

**10.** (4;1),(2;3),(7;2),(6;1),(5;5),(4;5),(3;3),(7;5),(6;5),(5;1)

**11.** (2;2),(2;4),(3;3),(5;6),(6;5),(3;3),(5;4),(6;5),(4;5),(5;6)

**12.** (2;5),(4;6),(3;3),(4;6),(4;5),(5;3),(6;4),(4;5),(3;5),(4;6)

**13.** (4;5),(5;6),(4;3),(5;7),(4;6),(6;3),(5;4),(3;5),(5;7),(4;7)

**14.** (4;6),(5;6),(5;3),(6;7),(5;6),(4;3),(6;4),(3;5),(6;5),(4;5)

**15.** (3;4),(3;2),(1;2),(4;3),(5;4),(4;5),(2;3),(5;4),(3;4),(3;6)

**16.** (3;2),(2;3),(3;2),(2;3),(3;5),(2;5),(2;3),(4;5),(3;5),(2;3)

**17.** (3;3),(4;3),(3;2),(3;1),(2;5),(3;5),(5;3),(3;5),(1;5),(4;3)

**18.** (4;3),(2;3),(4;2),(5;1),(3;4),(4;5),(2;3),(4;5),(3;5),(3;2)

**19.** (5;4),(3;4),(6;3),(5;4),(5;6),(3;4),(5;3),(4;5),(2;5),(4;2)

**20.** (4;2),(2;3),(4;2),(5;2),(5;4),(4;5),(2;3),(4;5),(6;5),(5;4)

**21.** (3;2),(3;4),(4;3),(5;6),(3;5),(4;3),(5;4),(3;5),(3;4),(4;4)

**22.** (4;5),(3;6),(4;5),(5;6),(4;5),(3;3),(6;4),(5;5),(4;5),(4;6)

**23.** (3;5),(5;6),(4;3),(6;5),(5;6),(6;3),(5;4),(4;5),(6;5),(3;4)

**24.** (5;4),(5;6),(4;3),(5;6),(5;6),(3;3),(5;4),(3;5),(4;5),(4;5)

**25.** (5;4),(3;2),(4;2),(2;3),(3;4),(4;5),(2;3),(3;5),(3;4),(3;6)

**26.** (3;2),(1;3),(3;2),(2;4),(2;3),(3;5),(2;3),(3;5),(2;4),(2;2)

**27.** (3;4),(2;3),(5;2),(4;1),(4;5),(5;5),(4;3),(3;5),(4;5),(4;1)

**28.** (4;3),(5;3),(5;2),(4;1),(2;5),(4;5),(2;3),(4;5),(3;5),(3;1)

**29.** (5;4),(3;3),(5;2),(5;3),(5;4),(3;5),(4;3),(3;5),(4;5),(4;2)

**30.** (4;3),(2;3),(6;2),(6;1),(5;5),(4;3),(5;3),(6;5),(6;5),(5;1)

## 2.4. SINGLE FACTOR ANOVA

Single factor ANOVA (analysis of variants), or dispersion analysis, is used to compare several means. In practice single factor ANOVA is used to find either some qualitative factor $A$, which has m levels $A_1$, $A_2$ ... $A_m$, play a significance influence on the observable value $X$ or not. For example, if it needs to know, which dose of roentgen radiance influences the rate of bacteria reproduction most effectively, then factor $A$ is *X-rays*, and its levels are doses of radiation.

Main idea of single factor ANOVA consists of comparison of the factor dispersion to the residual dispersion. It is proved in mathematical statistics that the factor dispersion characterizes the influence of factor $A$ on the value $X$ and the residual dispersion characterizes the influence random causes.

Let's consider the case, in which numbers of experiments are different on each level. Let's there were $q_1$ experiments on level $A_1$, $q_2$ experiments on level $A_2$, ..., $q_m$ experiments on level $A_m$.

Total sum of squared deviations of observable values from the mean is $\overline{}$ found by the following formulae:

$$S_{\text{tot}} = \left(P_1 + P_2 + ... + P_m\right) - (R_1 + R_2 + ... + R_m)^2 / n \,,$$

where

$P_1 = \sum_{i=1}^{q_1} x_{i1}^2$ is the sum of squared values being observed at level $A_1$;

$P_2 = \sum_{i=1}^{q_2} x_{i2}^2$ is the sum of squared values being observed at level $A_2$;

. . .

$$P_m = \sum_{i=1}^{q_m} x_{im}^2$$ is the sum of squared values being observed at level $A_m$;

$$R_1 = \sum_{i=1}^{q_1} x_{i1}^2 \quad R_2 = \sum_{i=1}^{q_2} x_{21}^2 \quad R_m = \sum_{i=1}^{q_m} x_{m1}^2$$ are the sums of the observable values at levels $A_1$, $A_2$, …, $A_m$;

$n = q_1 + q_2 + ... + q_m$ is the total number of experiments (the sample volume).

Factor sum of squared deviations of the group means from the common sum characterises the dispersion "between groups" and is calculated by the following formulae:

$$S_{\text{fact}} = R_1^2 / q_1 + R_2^2 / q_2 + ... + R_m^2 / q_m - (R_1 + R_2 + ... + R_m)^2 / n$$

Residual sum of squared deviations of the observable group values from their group mean characterises the dispersion "within groups" and is calculated by the following formulae:

$$S_{\text{res}} = S_{\text{tot}} - S_{\text{fact}}.$$

The dispersion factor is determined by the formulae:

$$S_{\text{fact}}^2 = S_{\text{fact}} / (m-1).$$

The residual dispersion is determined by the formulae:

$$S_{\text{res}}^2 = S_{\text{res}} / (m-1).$$

Factor and Residual dispersion are to be compared.

If the dispersion factor is less than residual dispersion, then a factor doesn't sufficiently influence value *X*.

If the dispersion factor is greater than residual dispersion, then Fisher-Snedecor criterion should be applied. For the purpose the observable value of the criterion should be found

$$F_{\text{эксп}}^{\text{набл}} = S_{\text{факт}}^2 \big/ S_{\text{ост}}^2$$

The critical value of the criterion Fкр is determined from the table of critical values of Fisher-Snedecor F-Distribution with given significance level $\alpha$ and two numbers degrees of freedom, namely numerator *m – 1* and denominator *n – m*.

If Fэкс>Fкр , then the hypothesis about equality of group means is rejected, namely factor A influences value *X* sufficiently.

The following steps are necessary for carrying out single factor ANOVA in EXCEL:

Input the data into a table. Each column corresponds to one level of the factor.

− Select command *Данные → Анализ данных*, then select *«Однофакторный дисперсионный анализ»* in *«Инструменты анализа»* list .
− Specify the input range, namely the data table, in the opening dialog box.
− In section *«Группирование»* set a switch into the field *«По столбцам»*.
− Specify the output range, namely a reference on the cells for result output.

EXAMPLE.

Determine the validity of the ferment's (factor A) influence on the product of biochemical synthesis output at significance level $\alpha \le 0.05$.

| № испытания | Уровни фактора А | | | |
|---|---|---|---|---|
| | А1 | А2 | А3 | А4 |
| 1 | 70 | 67 | 67 | 70 |
| 2 | 74 | 70 | 71 | 67 |
| 3 | 69 | 66 | 76 | 68 |

Однофакторный дисперсионный анализ

ИТОГИ

| Группы | Счет | Сумма | Среднее | Дисперсия |
|---|---|---|---|---|
| Столбец 1 | 3 | 213 | 71 | 7 |
| Столбец 2 | 3 | 203 | 67,66667 | 4,333333 |
| Столбец 3 | 3 | 214 | 71,33333 | 20,33333 |
| Столбец 4 | 3 | 205 | 68,33333 | 2,333333 |

Дисперсионный анализ

| Источник вариации | SS | df | MS | F | P-Значение | F критическое |
|---|---|---|---|---|---|---|
| Между группами | 30,91667 | 3 | 10,30556 | 1,212418 | 0,36606598 | 4,066180551 |
| Внутри групп | 68 | 8 | 8,5 | | | |
| Итого | 98,91667 | 11 | | | | |

Factor dispersion value S2факт=10.30556 is on the intersection of row *«Между группами»* and column *«MS»* in ANOVA table. Residual dispersion

value S2ост=8.5 is on the intersection of row «*Внутри групп*» and column «MS» in ANOVA table.

As S2факт> S2ост, Fisher-Snedecor criterion is applied.

The observable value of Fisher-Snedecor F-Distribution Fнабл = 1.212418, critical value Fкр = 4.06618 is obtained from the last column of ANOVA table. $F_{\text{набл}} < F_{\text{кр}}$, therefore factor A doesn't influence significantly value *X*.

## TASK 2.4.

The teaching process is aimed at the formation the following skills for students: general professional skills 1, 7; professional skills 21.

**Assuming the normal distribution of value X verify a significance of influence of factor A on value X using single factor ANOVA at significance level  p=0,05 проверить значимость according to the date in the table:**

1.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 50 | 54 | 60 | 40 |
| 2 | 54 | 56 | 55 | 44 |
| 3 | 40 | 58 | 53 | 45 |
| 4 | 44 | 60 | 50 | 50 |
| 5 | 45 | 65 | 52 | 51 |

2.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 73 | 71 | 78 | 70 |
| 2 | 72 | 70 | 76 | 73 |
| 3 | 71 | 73 | 72 | 71 |
| 4 | 75 | 72 | 70 | 74 |
| 5 | 76 | 68 | 74 | 75 |

3.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 45 | 40 | 50 | 52 |
| 2 | 43 | 38 | 56 | 51 |
| 3 | 50 | 37 | 53 | 48 |
| 4 | 53 | 42 | 48 | 46 |
| 5 | 48 | 44 | 49 | 67 |

4.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 63 | 71 | 69 | 72 |
| 2 | 67 | 73 | 70 | 70 |
| 3 | 68 | 71 | 68 | 71 |
| 4 | 69 | 72 | 67 | 73 |
| 5 | 70 | 74 | 56 | 75 |

5.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 40 | 36 | 46 | 36 |
| 2 | 39 | 35 | 44 | 38 |
| 3 | 37 | 40 | 41 | 35 |
| 4 | 38 | 41 | 43 | 37 |
| 5 | 36 | 38 | 39 | 45 |

6.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 72 | 75 | 73 | 68 |
| 2 | 76 | 70 | 76 | 70 |
| 3 | 78 | 68 | 77 | 68 |
| 4 | 70 | 65 | 80 | 65 |
| 5 | 76 | 64 | 39 | 64 |

7.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 105 | 55 | 85 | 67 |
| 2 | 90 | 60 | 80 | 89 |
| 3 | 95 | 65 | 75 | 78 |
| 4 | 100 | 50 | 80 | 65 |
| 5 | 85 | 64 | 39 | 64 |

8.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 78 | 84 | 87 | 69 |
| 2 | 76 | 76 | 82 | 87 |
| 3 | 79 | 65 | 76 | 79 |
| 4 | 78 | 59 | 88 | 66 |
| 5 | 87 | 67 | 38 | 65 |

9.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 77 | 88 | 84 | 68 |
| 2 | 67 | 75 | 86 | 86 |
| 3 | 98 | 67 | 75 | 76 |
| 4 | 77 | 54 | 84 | 65 |
| 5 | 86 | 64 | 39 | 66 |

10.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 56 | 67 | 87 | 67 |
| 2 | 65 | 56 | 56 | 87 |
| 3 | 45 | 78 | 45 | 78 |
| 4 | 77 | 67 | 76 | 89 |
| 5 | 67 | 56 | 78 | 76 |

11.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 40 | 44 | 50 | 30 |
| 2 | 44 | 46 | 45 | 34 |
| 3 | 30 | 48 | 43 | 35 |
| 4 | 34 | 50 | 40 | 40 |
| 5 | 35 | 55 | 42 | 41 |

12.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 63 | 61 | 68 | 60 |
| 2 | 62 | 60 | 66 | 63 |
| 3 | 61 | 63 | 62 | 61 |
| 4 | 65 | 62 | 60 | 64 |
| 5 | 66 | 58 | 64 | 65 |

13.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 35 | 30 | 40 | 42 |
| 2 | 33 | 28 | 46 | 41 |
| 3 | 40 | 27 | 43 | 38 |
| 4 | 43 | 32 | 38 | 36 |
| 5 | 38 | 34 | 39 | 57 |

14.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 53 | 61 | 59 | 62 |
| 2 | 57 | 63 | 60 | 60 |
| 3 | 58 | 61 | 58 | 61 |
| 4 | 59 | 62 | 57 | 63 |
| 5 | 60 | 64 | 46 | 65 |

15.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 30 | 26 | 36 | 26 |
| 2 | 29 | 25 | 34 | 28 |
| 3 | 27 | 30 | 31 | 25 |
| 4 | 28 | 31 | 33 | 27 |
| 5 | 26 | 28 | 29 | 35 |

16.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 62 | 65 | 63 | 58 |
| 2 | 66 | 60 | 66 | 50 |
| 3 | 68 | 58 | 67 | 58 |
| 4 | 60 | 55 | 70 | 55 |
| 5 | 66 | 54 | 29 | 54 |

17.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 95 | 45 | 75 | 57 |
| 2 | 80 | 50 | 70 | 79 |
| 3 | 85 | 55 | 65 | 68 |
| 4 | 99 | 40 | 70 | 55 |
| 5 | 75 | 54 | 29 | 54 |

18.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 68 | 74 | 77 | 59 |
| 2 | 66 | 66 | 72 | 77 |
| 3 | 69 | 55 | 66 | 69 |
| 4 | 68 | 49 | 78 | 56 |
| 5 | 77 | 57 | 28 | 55 |

19.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 67 | 78 | 74 | 58 |
| 2 | 57 | 65 | 76 | 76 |
| 3 | 88 | 57 | 65 | 66 |
| 4 | 67 | 44 | 74 | 55 |
| 5 | 76 | 54 | 29 | 56 |

20.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 46 | 57 | 77 | 57 |
| 2 | 55 | 46 | 46 | 77 |
| 3 | 35 | 68 | 35 | 68 |
| 4 | 67 | 57 | 66 | 79 |
| 5 | 57 | 46 | 68 | 66 |

21.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 60 | 64 | 70 | 50 |
| 2 | 64 | 66 | 65 | 54 |
| 3 | 50 | 68 | 63 | 55 |
| 4 | 54 | 70 | 60 | 60 |
| 5 | 55 | 75 | 62 | 61 |

22.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 83 | 81 | 88 | 80 |
| 2 | 82 | 80 | 86 | 83 |
| 3 | 81 | 83 | 82 | 81 |
| 4 | 85 | 82 | 80 | 84 |
| 5 | 86 | 78 | 84 | 85 |

23.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 55 | 50 | 60 | 62 |
| 2 | 53 | 48 | 66 | 61 |
| 3 | 60 | 47 | 63 | 58 |
| 4 | 63 | 52 | 58 | 56 |
| 5 | 58 | 54 | 59 | 57 |

24.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 73 | 81 | 79 | 82 |
| 2 | 77 | 83 | 80 | 80 |
| 3 | 78 | 81 | 78 | 81 |
| 4 | 79 | 82 | 77 | 83 |
| 5 | 80 | 84 | 66 | 85 |

25.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 50 | 46 | 56 | 46 |
| 2 | 49 | 45 | 54 | 48 |
| 3 | 47 | 50 | 51 | 45 |
| 4 | 48 | 51 | 53 | 47 |
| 5 | 46 | 48 | 49 | 55 |

26.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 82 | 85 | 83 | 78 |
| 2 | 86 | 80 | 86 | 80 |
| 3 | 88 | 78 | 87 | 78 |
| 4 | 80 | 75 | 90 | 75 |
| 5 | 86 | 74 | 49 | 74 |

27.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 95 | 65 | 95 | 77 |
| 2 | 100 | 70 | 90 | 99 |
| 3 | 105 | 75 | 85 | 88 |
| 4 | 110 | 60 | 90 | 75 |
| 5 | 95 | 74 | 49 | 74 |

28.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 88 | 94 | 97 | 79 |
| 2 | 86 | 86 | 92 | 97 |
| 3 | 89 | 75 | 86 | 89 |
| 4 | 88 | 69 | 98 | 76 |
| 5 | 97 | 77 | 48 | 75 |

29.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 87 | 98 | 94 | 78 |
| 2 | 77 | 85 | 96 | 96 |
| 3 | 88 | 77 | 85 | 86 |
| 4 | 87 | 64 | 94 | 75 |
| 5 | 96 | 74 | 49 | 76 |

30.

| Number of observation | Levels of factor A | | | |
|---|---|---|---|---|
| | **A1** | **A2** | **A3** | **A4** |
| 1 | 66 | 77 | 97 | 77 |
| 2 | 75 | 66 | 66 | 97 |
| 3 | 55 | 88 | 55 | 88 |
| 4 | 87 | 77 | 86 | 99 |
| 5 | 77 | 66 | 88 | 86 |

# MULTIPLE CHOICE QUESTIONS (MCQ)

The teaching process is aimed at the formation the following skills for students: general cultural skills 1, 5; general professional skills 1, 7; professional skills 21.

*Choose one correct answer.*

## MCQ for Theme 1.2

1. EDITING TEXT IS *(general cultural skills 1, 5; general professional skills 1)*:

    a) the procedure for storing text on disk as a text file

    b) the process of transmitting text information over a computer network

    c) the process of making changes to the existing text

    d) the procedure for reading from the external storage device of the previously created text


2. IN A TEXT EDITOR, WHEN SETTING PAGE PARAMETERS, THE FOLLOWING ARE SET *(general cultural skills 1, 5)*:

    a) field orientation

    b) typeface, size, type

    c) indent, spacing

    d) style, pattern


3. WITH THE HELP OF WHICH PROGRAM IN WORD YOU CAN CREATE A DIAGRAM *(general professional skills 1, 7; professional skills 21)*:

    a) Microsoft Clip Gallery

    b) Microsoft Graph

    c) Microsoft Mar

    d) Microsoft Equation Editor

4. IN A TEXT EDITOR, THE MAIN PARAMETERS WHEN SETTING PARAGRAPH PARAMETERS ARE *(general professional skills 1, 7; professional skills 21)*:

    a) typeface, size, type

    b) field orientation

    c) style, pattern

    d) indent, spacing

5. WITH THE HELP OF A PROGRAM IN WORD, YOU CAN TYPE THE FORMULA *(general cultural skills 1, 5; professional skills 21)*:

    a) Microsoft Equation Editor

    b) Microsoft Clip Gallery

    c) Microsoft Graph

    d) Microsoft Map

## MCQ for Theme 1.2

1. IN THE ELECTRONIC TABLE CANNOT BE REMOVED *(general cultural skills 1, 5)*:

    a) column

    b) line

    c) cell name

    d) cell contents

2. THE MAIN ELEMENT OF THE ELECTRONIC TABLE IS *(general cultural skills 1, 5)*:

    a) cell

    b) line

    c) column

    d) table

3. SPECIFY AN INCORRECT FORMULA *(general professional skills 1, 7; professional skills 21)*:

    a) = A2 + B4

    b) = A1 / C453

    c) = S245M67

    d) = O89-К89

4. WHEN MOVING OR COPYING IN THE ELECTRONIC TABLE ABSOLUTE LINKS *(general professional skills 1, 7; professional skills 21)*:

    a) do not change

    b) are converted regardless of the new position of the formula

    c) are converted according to the new position of the formula

    d) converted according to the length of the formula

5. THE RANGE IS *(general professional skills 1, 7; professional skills 21)*:

    a) all cells of one row

    b) a set of cells forming a rectangular area in the table

    c) all cells of one column

    d) the set of valid values

**MCQ for Theme 2.1**

1. HOW MANY STAGES IS THE WORK WITH THE MASTER OF FUNCTIONS? (general professional skills 1, 7; professional skills 21)

    a) 3

    b) 2

    c) 4

    d) 1

2. TO SUM THE CELLS, WHICH SATISFY A CERTAIN CRITERION, THE FUNCTION IS USED *(general cultural skills 1, 5; professional skills 21)*

    a) СчетЕсли

    b) СуммЕсли

c) Счет

d) СрЗнач

3. TO COUNT THE NUMBER OF VALUES IN A RANGE, USE THE FUNCTION *(general professional skills 1, 7; professional skills 21)*

    a) СчетЕсли

    b) СуммЕсли

    c) Счет

    d) СрЗнач

4. THE CELL FOR WHICH YOU NEED TO FIND THE MAXIMUM, MINIMUM AND SPECIFIED VALUE IS CALLED *(general cultural skills 1, 5)*

    a) Target cell

    b) Changeable cell

    c) Maximum cell

    d) Restricted cell

**MCQ for Theme 2.2**

1. HOW SHOULD THE FOLLOWING FORMULA BE WRITTEN: MULTIPLY CELL A1 BY 6, AND DIVIDE THAT BY 4? *(general cultural skills 1, 5)*

    a) =A1X6/4

    b) =A1X6%4

    c) =A1*6/4

    d) =A1*6%4

2. THE CELL IN WHICH THE VALUE OF THE TARGET CELL DEPENDS *(general professional skills 1, 7; professional skills 21)*

    a) Target cell

    b) Changeable cell

    c) Maximum cell

d) Restricted cell

3. IN A CERTAIN WAY, AN ARRAY OF DATA FORMED ON A SHEET WITH COLUMNS AND ROWS IS CALLED *(general professional skills 1, 7; professional skills 21)*

    a) List

    b) Database

    c) Parameters

4. TABLE THAT IS USED TO QUICKLY SUMMARIZE OR COMBINE LARGE AMOUNTS OF DATA IS CALLED *(general cultural skills 1, 5; professional skills 21)*

    a) Consolidation

    b) Summary table

    c) Data analysis

    d) Table

5. TO DETERMINE THE PERCENTAGE NORM OF THE NUMBER, THE FUNCTION IS USED *(general professional skills 1, 7; professional skills 21)*

    a) СчетЕсли

    b) СуммЕсли

    c) Счет

    d) СрЗнач

**MCQ for Theme 2.3**

1. A SPREADSHEET IS *(general professional skills 1, 7; professional skills 21)*:

    a) application program for processing code tables

    b) the device of a personal computer that controls its resources

    c) an application program designed to process data structured as a table

d) system program that manages the resources of a personal computer when processing tables

2. EXCEL EDITOR IS *(general cultural skills 1, 5; professional skills 21)*:

    a) Database editor

    b) Tabular editor

    c) Text editor

    d) Editor of the printed publication

3. TO REDRAW THE TEXT ACROSS SEVERAL CELLS VERTICALLY, SELECT THE CELLS AND SPECIFY THE COMMAND *(general cultural skills 1, 5; general professional skills 1, 7; professional skills 21)*

    a) Home - Fill

    в) Type - Fill

    c) Edit - Paste Special

    d) Form – Data

4. WHICH OF THE FUNCTIONS IS NOT STATISTICAL? *(general cultural skills 1, 5; general professional skills 1, 7; professional skills 21)*

    a) MAX

    b) МИН

    c) СРЗНАЧ

    d) СУММ

**MCQ for Theme 2.4**

1. WHICH ARGUMENTS CANNOT BE USED FOR THE LN FUNCTION? *(general professional skills 1, 7; professional skills 21)*

    a) 3

    b) 0

    c) 3

    d) 10

2. AFTER EXECUTING THE COMMAND FILTER - AUTOFILTER - CONDITION, VALUE IN CONDITIONS ARE SET USING (general cultural skills 1, 5):

    a) text constants

    и) numeric constants

    c) links

    d) expressions

3. TO DELETE ROWS IN EXCEL SPREADSHEET, USE THE COMMAND *(general cultural skills 1, 5; professional skills 21)*:

    a) Table - Delete row

    b) Tools - Options - Delete - Row

    c) Home - Delete - Delete Row

    d) Edit - Cut – String

4. TO DELETE COLUMNS IN EXCEL TABLE, USE THE COMMAND *(general professional skills 1, 7; professional skills 21)*:

    a) Home - Delete - Delete Column

    в) Table - Delete Column

    c) Tools - Options - Delete - Column

    d) Edit - Cut – Column

## KEYS

| No. | Theme 1.1 | Theme 1.2 | Theme 2.1 | Theme 2.2 | Theme 2.3 | Theme 2.4 |
|---|---|---|---|---|---|---|
| **1.** | c | c | a | c | c | a |
| **2.** | a | a | b | b | b | b,c |
| **3.** | в | c | c | b | a | c |
| **4.** | d | a | a | b | d | a |
| **5.** | a | d | - | a | - | - |

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