

**Ministry of Public Health of Ukraine
Kharkov National Medical University**

Hygiene and Ecology

**Workbook
for students of medical faculty**

**Module 2
Special problems of hygiene and ecology**

Student _____

Year of training _____

Group _____

CONTENTS

Topic 1.	Structure of sanitary-epidemiological station, sanitary legislation. Methods of sanitary investigation of object and performing the act of sanitary investigation	2
Topic 2.	Sanitary purification of populated areas. General scheme of purification of domestic sewage	5
Topic 3.	Methods of psychohygiene and primary psychical prophylaxis	7
Topic 4.	Scientific backgrounds of medical biorhythmology and chronohygiene	13
Topic 5.	Hygienic estimation of the placement and design of separate hospital departments by the project	18
Topic 6.	The method of sanitary-hygienic inspection of the medical preventive establishments	25
Topic 7.	Sanitary-hygienic inspection of food department of hospital.....	32
Topic 8.	Sanitary inspection of radiological department of hospital	37
Topic 9.	Sanitary-hygienic inspection of an X-ray room	42
Topic 10.	Hygiene estimation of tropical climate its influence on the living condition, work ability and population health	45
Topic 11.	Water and water supply hygiene in tropical climate conditions.....	48
Topic 12.	Hygienic, toxicological and epidemiological peculiarities of nutrition in tropical regions	51

SPECIAL ASPECTS OF HYGIENE

LIST OF COMPULSORY PRACTICAL SKILLS FOR STUDENTS

№	Name of practical skill	Date of its working up	Mark	Signature of the teacher
1.	Carry out sanitary inspection of the object of sanitary supervision			
2.	Master the method of selection of principal schemes of sewage in accordance with local conditions			
3.	Determine temperament and character attributes, motivation direction and human personality nervous and mental condition peculiarities			
4.	Determine different types of biological rhythms day curves, the type of day work capacity and calculation biological rhythms			
5.	Determine and assess the project patient care institutions' location using the construction drawings of the situational plan-			
6.	Determine and assess the project patient care institutions' territory zoning using the construction drawings of the general plan-			
7.	Determine and assess the correspondence of the hospital premises' area, cubic capacity and sanitary accomplishment to hygienic standards; their correspondence to the functional purpose using the constructions' plans and slits			
8.	Carry out the sanitary inspection and determine the objective figures of the hygienic condition of the situational plan of hospital			
9.	Carry out the sanitary inspection and determine the objective figures of the hygienic condition of the general plan of hospital -			
10.	Carry out the sanitary inspection and determine the objective figures of the hygienic condition of the internal design of department and hospital ward of the hospital			
11.	Perform the act of sanitary- hygienic inspection of hospital with conclusion			
12.	Carry out the sanitary-hygienic inspection of food department with performing of the act of sanitary-hygienic inspection of food department with conclusion			
13.	Carry out sanitary inspection of radiological departments of hospitals			
14.	Carry out the sanitary-hygienic inspection of the X-ray room			
15.	Master method of estimation of organism thermoregulation and heat metabolism in hot and tropical conditions			
16.	Master the medical control methods of hot and tropical regions water supply and prevention of waterborne diseases			
17.	Carry out medical control of nutrition sufficiency and safety, use methods and measures for prevention of diseases among certain population groups in tropical regions			

Subject 1. STRUCTURE OF SANITARY-EPIDEMIOLOGICAL STATION, SANITARY LEGISLATION. METHODS OF SANITARY INVESTIGATION OF OBJECT AND PERFORMING THE ACT OF SANITARY INVESTIGATION

Learning objective

- Become acquainted with sanitary epidemiological service in Ukraine, ways and means of population health protection, prophylaxis of diseases.
- Become acquainted with preventive and current sanitary supervision, their tasks and stages.
- Become acquainted with main kinds of sanitary investigation and description of object of sanitary supervision.

Basics

You should know :

- Structure and main tasks of sanitary epidemiological service in Ukraine.
- Notion and contents of preventive and current sanitary supervision, their tasks.
- Stages of sanitary hygienic investigation of objects.

You should have the following skills:

- To carry out sanitary inspection of the object of sanitary supervision.
- To perform the act of sanitary inspection with conclusion.

Self-training assignments:

Main tasks of preventive sanitary supervision:

- 1.....
.....
- 2.....
.....
- 3.....
.....
- 4.....
.....
.....

Main tasks of current sanitary supervision:

- 1.....
.....
- 2.....
.....
- 3.....
.....

4.....
.....
.....

Main stages of preventive sanitary supervision:

1.....
.....
.....

2.....
.....
.....

3.....
.....
.....

4.....
.....
.....

Main stages of current sanitary supervision:

1.....
.....
.....

2.....
.....
.....

3.....
.....
.....

4.....
.....
.....

5.....
.....
.....

Main kinds of inspection of sanitary investigation objects

1.....
.....
.....

2.....
.....
.....

3.....
.....
.....

4.....
.....
.....

The Form of the “Act of sanitary infestation” of sanitary supervision objects:

1. Introductory part:

.....
.....
.....
.....
.....

2. State part:

.....
.....
.....
.....
.....

3. Conclusion part:

.....
.....
.....
.....
.....

4. Dictate part:

.....
.....
.....
.....
.....

Test questions

1. Structure of sanitary – epidemiological service in Ukraine.
2. Structure of sanitary – epidemiological station.
3. Main directions and stages of preventive sanitary supervision.
4. Main directions and stages of current sanitary supervision.
5. Kinds of sanitary – hygienic investigation of sanitary supervision objects.
6. Methods of performing act of sanitary inspection of object.

Signature
of the Teacher_____

Signature
of the Student_____

Subject 2. SANITARY PURIFICATION OF POPULATED AREAS. GENERAL SCHEME OF PURIFICATION OF DOMESTIC SEWAGE

Learning objective:

- To become acquainted with system of sanitary purification of populated areas and general scheme of domestic sewage purification.
- To become acquainted with main schemes of domestic sewage purification. To master the method of selection of principal schemes of sewage in accordance with local conditions.

Basics

You should know :

- Notion "waste", their classification and main systems of waste removing from populated areas.
- Essence of planned system of solid waste collection and export.
- Main methods of domestic waste render harmless (decontamination); hygienic requirements to them.
- Main systems and schemes of domestic sewage purification.

You should have the following skills

- Carry out sanitary inspection of the building for clearance.
- To calculate efficiency of domestic sewage purification on the station of biological purification.

Self-training assignments:

3.1. Situational task № 1. During the sanitary inspection of factory for biothermal work of solid domestic waste (SDW) it was founded out: 20 volumes of air set for 1 volume of SDW; humidity of SDW is 20 %, organic substances- 80%; among them 40% of easily decay; 20% nonorganic substances; sizes of solid particles are 27-32mm; pH is 7.2. Make up hygienic estimation of efficiency biothermal method of render harmless on the base of these conditions. Make up measures, which are directed to increase of efficiency of SDW render harmless.

Solution of situational task

.....
.....
.....
.....
.....
.....

3.2. Situational task № 2. Sanitary inspection of district hospital shows: the area of hospital plot is 4 h; domestic area for dustbins is 35m², distance from domestic area to food department is 40m, to medical building-55m. 42 enameled cisterns are placed on the hospital territory on the distance 15m one by one.

Make up hygienic estimation of sanitary investigation. Make up recommendations for liquidation of breach of sanitary rules for clearing medical establishments territory.

Solution of situational task

.....

.....

.....

.....

.....

3.3 Situational task № 3. Calculate efficiency of sewage purification on the station of biological purification according next data.

Indices of pollution	Units of measurement	Stages of purification					
		Before purification		After mechanical purification		After biological purification	
		Units	%	Units	%	Units	%
Suspended particles	mg/dm ³	179		105		15	
BNO	mg O ₂ /dm ³	200		110		17	
Oxidation	mg O ₂ /dm ³	64		36		12	
Microbial number		3,2 · 10 ⁶		1,7 · 10 ⁶		1,1 · 10 ⁴	
Number of helminth's eggs		1,5 · 10 ³		76		12	

Solution of situational task

.....

.....

.....

.....

.....

.....

Test questions

1. Hygienic significance of purification of populated areas.
2. Hygienic character of main systems of population areas purification.
3. Hygienic character of system of populated area purification.
4. Hygienic character of sewage main systems.
5. Hygienic character natural methods of domestic sewage purification.
6. Hygienic character of artificial methods and main buildings for mechanical and biological purification of sewage.

Signature
of the Teacher _____

Signature
of the Student _____

Subject 3. METHODS OF PSYCHOHYGIENE AND PRIMARY PSYCHICAL PROPHYLAXIS

Learning objective:

- Master theoretical knowledge about mental health and its basic criteria, leading peculiarities of human personality.
- Master methods of temperament and character attributes determination, motivation direction and human personality nervous and mental condition peculiarities determination.

Basics

You should know:

- Main objectives of psychohygiene and main criteria of mental health assessment.
- Hereditary factors and environment factors influence on children's and adolescents' mental health.
- Leading peculiarities of human personality (temperament and character attributes, motivation direction, and nervous and psychological state peculiarities) and their psycho-hygienic value.

You should have the following skills:

- To determine the leading human personality peculiarities.
- To use psycho-hygienic principles of person's daily activity optimization during training and in free time.

Self-training assignments:

1. Determine basic attributes of your temperament

Hygienic assessment of individual and typical organism peculiarities especially temperament characteristics allows to determine people with different degree of leading polar basic attributes of higher nervous activity such as extraversion – introversion; rigidity of nervous processes - plasticity of nervous processes, emotional excitement - emotional balance, reactions rate (slow-fast), activity (high- low).

In order to determine basic temperament attributes it is necessary to suggest a person to answer the questionnaire honestly and quickly. A person can answer only "Yes" or "No".

1. Do you like being in a company frequently?
2. Do you avoid to own things which are not reliable or not firm but beautiful?
3. Do you often have changes of mood?
4. Do you speak quickly?
5. Do you like work which takes high force exertion?
6. Do you gossip?
7. Are you cheerful and funny person?
8. Do you get accustomed to certain clothes, its style, colour and don't want to change it?
9. Do you often feel that you need a person who understands you, can praise you or cheer up?

10. Is your handwriting quick?
11. Do you look for a work if you can rest?
12. Do you keep your promises?
13. Do you have many good friends?
14. Is it difficult for you to distract from one activity which you are strongly involved into and change it into another?
15. Do you often feel guilty?
16. Do you always walk quickly?
17. Do you think over difficult tasks until you solve it?
18. Can your intellectual activity sometimes be worse than usual?
19. Are you a sociable person?
20. Do you plan your behavior during future meeting?
21. Are you easily insulted by somebody's jokes?
22. Do you gesticulate while speaking?
23. Do you wake up fresh and cheerful?
24. Do you have such thoughts, which you wish nobody knew?
25. Do you like mocking?
26. Do you check your thoughts before express them?
27. Do you have nightmares?
28. Do you remember and study easily?
29. Is it difficult for you to sit still for some hours without any work?
30. Do you lose your temper when you're angry?
31. Can you cheer up a dull company?
32. Do you think for a long time before making an important decision?
33. Do you take everything to heart?
34. Do you like games which require speed and good reaction?
35. If you don't cope with something, do you keep on trying till the end?
36. Did you have feeling of irritation towards your parents?
37. Are you sincere and do you like companies?
38. Is it difficult for you to start a new work?
39. Do you have the feeling that you're worse than others?
40. Is it difficult for you to work with slow people?
41. Can you work efficiently the whole day without being tired?
42. Do you have harmful habits?
43. Are you careless person?
44. Do you consider your good friends only those, whose friendship to you is reliable and checked?
45. Are you easily irritated?
46. Do you find the best answer during discussion?
47. Do you force yourself to work for long periods of time or do something?
48. Do you discuss things which you don't know?

Questionnaire code

EXTRAVERSION

“Yes” 1, 7, 13, 19, 25, 31, 37 – 3 marks

“No” 4, 43 – 2 marks

“No” 2 – 1 mark

RIGIDITY OF NERVOUS PROCESSES

“Yes” 8, 26, 32 – 3 marks

“Yes” 2, 14, 20, 38, 44 – 2 marks

“No” 37 – 2 marks

“No” 19, 46 – 1 mark

EMOTIONAL EXCITEMENT

“Yes” 15, 21, 33, 39, 45 – 3 marks

“Yes” 3, 9 – 2 marks

“Yes” 27 – 1 mark

REACTION TEMPO

“Yes” 4, 16, 28 – 3 marks

“Yes” 10, 22, 34, 40, 46 – 2 marks

“Yes” 17, 29, 37 – 1 mark

ACTIVITY

“Yes” 5, 11, 17, 23, 29, 35, 41, 47 – 3 marks

“Yes” 10 – 1 mark

“No” 38 – 1 mark

SINCERITY

“Yes” 30, 36, 42, 48 – 3 marks

“Yes” 6, 12 – 2 marks

“Yes” 18, 24, 25 – 1 mark

Assessment of results

EXTARVERSION

22-26 – extremely high extraversion

17-21 – high extraversion

12-16 – middle extraversion

7-11 – high introversion

0-6 – extremely high introversion

RIGIDITY OF NERVOUS PROCESSES

16-23 – extremely high rigidity

12-15 – high rigidity

7-11 – middle plasticity of nervous processes

3-6 – high plasticity

0-2 – extremely high plasticity of nervous processes

EMOTIONAL EXCITEMENT

- 18-20 – extremely high emotional excitement
- 14-17 – high emotional excitement
- 8-12 – middle emotional composure
- 4-7 – high emotional composure
- 0-3 –extremely high emotional composure

REACTION TEMP

- 20-22 – extremely quick
- 14-19 – quick
- 9-13 – middle
- 5-8 – slow
- 0-4 – extremely slow

ACTIVITY

- 24-26 – extremely high
- 21-23 – high
- 14-20 – middle
- 9-13 – low
- 0-8 – extremely low

SINCERITY

- 13-20 – high
- 8-12 – middle
- 0-7 –low (answers are not reliable).

Conclusion _____

2. Determine motivation direction and solicitation level of a your person

Solicitation level of a person means needs, motives and other personality features which are expressed in a degree of purpose complication which a person wants to achieve.

Modified form of questionnaire by V.K.Gorbachevsky is used to determine *motivation direction of a person*. Usage of questionnaire allows to estimate the following components of motive personality structure: inner motive which is connected with the activity process; cognitive motive which characterizes person’s attitude to results of its activity; avoiding motive; general motive; motive to activity changing; self-esteem motive which is expressed by person’s desire to set more and more complicated purpose in daily life.

Also this questionnaire allows to estimate such elements of personality motive structure as degree of volitional efforts expression; strength mobilization level which has been set; initiative; gives opportunity to self-concept of achieved results and intellectual potential.

The tested person is suggested to read each statement and decide whether to agree or disagree with them. Then according to this decision the person should choose one of the variant and to assess the question. If the person completely agrees - +3; if agrees - +2; if more agrees than disagrees - +1; if more disagrees than agrees - -1; if disagrees - 2; if completely disagrees - -3. In case of hesitation and if it is impossible to agree or disagree with the statement - 0.

1. I'm fed up with work which I do every day.
2. I'm half-exhausted while working.
3. I want to show what I can.
4. I feel that I'm forced to achieve good results.
5. I'm interested in result.
6. The task which is being solved is complicated.
7. Nobody needs my work.
8. I'm interested whether my results are better or worse than others have.
9. I'd like to do another activity.
10. I think results of my work will be high.
11. Situations and problems connected with my activity can cause troubles.
12. More results you have more you want to exceed them.
13. I express enough efforts.
14. I consider my best result isn't a coincidence.
15. I'm not interested in my work.
16. I set purpose and tasks on my own.
17. I worry about my work results.
18. I'm energetic while working.
19. I can't achieve better results.
20. My work is very important for me.
21. I always set a complicated purpose.
22. I don't care about results of my work.
23. The more I work, the more I'm interested in it.
24. I don't want to work with all my forces.
25. Maybe my results will be low.
26. Even if you try the result won't change.
27. I'd like to do any work apart from which I do now.
28. My work is easy.
29. I can achieve better result.
30. The more complicated is the goal, the more I want to achieve it.
31. I feel I can cope with any troubles to achieve the goal.
32. I don't care about my results in comparison with others.
33. I'm fond of my work.
34. I want to prevent low results.
35. I'm independent.
36. I think that I waste my forces and time.
37. I work with half forces.
38. I'm interested to reach the border of my abilities.
39. I want my result to be the best.
40. I will do everything to achieve my goal.
41. I feel that I can't cope with it.
42. Exams are lottery.

The processing of results requires to transfer results into standard marks according to rules of direct or inverse transferring.

Direct transferring: -3 – 1 point; -2 – 2 points; -1 – 3 points; 0 – 4 points; +1 – 5 points; +2 – 6 points; +3 – 7 points.

Inverse transferring: -3 – 7 points; -2 – 6 points; -1 – 5 points; 0 – 4 points; +1 – 3 points; +2 – 2 points; +3 – 1 point.

Code for results assessment (i-inverse transferring):

Assessment of results

Inner motive – 15i; 23; 33.

Cognitive motive – 5; 22i; 38.

Avoid motive – 11; 17; 34.

General motive – 8; 32i; 39.

Self-esteem motive – 12; 21; 30.

Significance of results – 7i; 20; 36i.

Complication of the task – 6; 28i.

Volitional efforts – 2; 13; 37i.

Assessment of the achieved results level – 19i; 29.

Assessment of own potential assessment – 18; 31; 41i.

Set level of forces mobilization – 3; 24i; 40.

Level of supposed results – 10; 25i.

Regularity of results – 14; 26i; 42i.

Initiative – 4i; 16; 35.

3-7 – low level

8-14 – average level

15-21 – high level

Conclusion _____

Test questions

1. Psychohygiene as a science, it's main objective, methods and means.
2. Concept of person health and main criteria of its assessment. Boundary neuropsychic and mental disorders and abnormalities as a hygienic problem.
3. Critical periods of psychological development. Hereditary factors impact peculiarities and environment factors influence on children and adolescents mental health.
4. Main human personality peculiarities (temperament and character attributes, motivation direction, and nervous and psychological state peculiarities) and methods of their studying.
5. Psychohygienic basics of daily activity optimization.

Signature
of the Teacher _____

Signature
of the Student _____

Subject 4. SCIENTIFIC BACKGROUNDS OF MEDICAL BIORHYTHMOLOGY AND CHRONOHYGIENE

Learning objective:

- Strengthen the theoretical knowledge on biological rhythms and their main characteristics and types.
- Master the methods of determination of the physiological, psychological and physiological, and calculation correlates of the organism biological rhythm.
- Learn the biorhythmological principles of the rational organization of the people's everyday activity.

Basics:

You should know:

- Initial conditions and development reasons of medical biorhythmology as a science and its psychohygienic value.
- Main characteristics and classifications of the most widespread biological rhythms.
- Development reasons and the main clinical manifestations of desynchronization as a medical and hygienic category.

You should have the following skills:

- To determine different types of biological rhythms day curves, the type of day work capacity and calculation biological rhythms.
- To use during the organization of educational (working) process and in one's free time the biorhythmological principles of the rational organization of the everyday activity.

Self-training assignments

1. Determination of the human day work capacity type

The most adequate and accurate method of the day work capacity type is the test method by O. Ostberg, modified by S. Stepanova. The examined person is suggested to read thoroughly the questions of the personal questionnaire and strictly following their order to choose the most typical for him variant of answer.

1. What time would you prefer to wake up if you were free enough to plan your day schedule according to your own desire?

	in winter	in summer	points
a)	$5^{00} - 6^{45}$	$4^{00} - 5^{45}$	5
b)	$6^{46} - 8^{15}$	$5^{46} - 7^{15}$	4
c)	$8^{16} - 10^{45}$	$7^{16} - 9^{45}$	3
d)	$10^{46} - 12^{00}$	$9^{46} - 11^{00}$	2
e)	$12^{00} - 13^{00}$	$11^{01} - 12^{00}$	1

2. What time would you prefer to go to bed if you were free enough to plan your evening time according to your own desire?

in winter	in summer	points
a) $20^{00} - 20^{45}$	$21^{00} - 21^{45}$	5
b) $20^{46} - 21^{30}$	$1^{46} - 22^{30}$	4
c) $21^{31} - 00^{15}$	$2^{31} - 1^{15}$	3
d) $00^{16} - 1^{30}$	$1^{16} - 2^{30}$	2
e) $1^{31} - 3^{00}$	$2^{31} - 4^{00}$	1

3. Do you need an alarm clock if you have to wake up early in the morning at the definite time?

a) I don't need it at all	4
b) I need it in some cases	3
c) I really need it	2
d) Obligatory, I can't without it	1

4. If you had to be preparing for exam being limited in time and using night time ($23^{00} - 2^{00}$) for learning, how efficient could your work at night be?

a) Absolutely inefficient, I couldn't work at that time	4
b) There could be some benefit	3
c) My work could be quite efficient	2
d) My work could be highly efficient	1

5. Is it easy for you to wake up in the morning under the usual conditions?

a) Very difficult	1
b) Difficult enough	2
c) Easy enough	3
d) Very easy	4

6. Do you feel that you have woken up finally during the first 30 minutes after you got up?

a) I have terrible somnolence	1
b) I am sleepy a little	2
c) I am awake enough	3
d) I am absolutely awake	4

7. What is your appetite during the first 30 minutes since you have gotten up?

a) I have no appetite	1
b) My appetite is reduced	2
c) Good enough	3
d) Perfect appetite	4

8. If you had to be preparing for exam being limited in time and using morning time ($4^{00} - 7^{00}$) for learning, how efficient could your work at that time be?

a) Absolutely inefficient	1
b) I couldn't work at that time	2
c) There could be some benefit	3
d) My work could be efficient	4

9. Do you feel any physical tiredness during the first 30 minutes since you have gotten up?
- a) Very severe weakness 1
 - b) I am rather weak 2
 - c) I am rather vigorous 3
 - d) Absolute vivacity 4
10. If you are having a day off tomorrow, what time will you go to bed?
- a) Not later than usually 4
 - b) 1 hour or less later 3
 - c) 1-2 hours later 2
 - d) 2 hours and more later 1
11. How easy do you fall asleep under the usual conditions?
- a) Very difficult 1
 - b) Difficult enough 2
 - c) Easy enough 3
 - d) Very easy 4
12. You've decided to go be engaged in physical training. Your friend has suggested doing it together during 1 hour twice a week from 7⁰⁰ till 8⁰⁰ in the morning. Is this the best time for you?
- a) I would prefer that time also 1
 - b) I could be quite fit 2
 - c) It could be difficult for me 3
 - d) It could be very difficult for me 4
13. When in the evening you are tired enough to feel like going to bed?
- a) 20⁰⁰ – 21⁰⁰ 5
 - b) 21⁰¹ – 22¹⁵ 4
 - c) 22¹⁶ – 00⁴⁵ 3
 - d) 00⁴⁶ – 2⁰⁰ 2
 - e) 2⁰¹ – 3⁰⁰ 1
14. Which of the suggested time would you prefer to fulfill 2-hour work requiring absolute mobilization of your mental activity?
- a) 8⁰⁰ – 10⁰⁰ 6
 - b) 11⁰⁰ – 13⁰⁰ 4
 - c) 15⁰⁰ – 17⁰⁰ 2
 - d) 19⁰⁰ – 21⁰⁰ 0
15. How tired are you at 11 p.m.?
- a) Very tired 5
 - b) Quite tired 3
 - c) Partially tired 2
 - d) Not tired at all 0

16. Due to some circumstances you had to go to bed some hours later than usual. It's not necessarily to wake up in the morning at the definite time. Which of the suggested variants is the most suitable for you?

- a) I will wake up and won't fall asleep any more 4
- b) I will wake up as usual and will be dozing 3
- c) I will wake up as usual and then will fall asleep again 2
- d) I will wake up later than usual 1

17. You have to be on duty at night from 4 to 6 a.m. The next day you are free. Which of the suggested variants is the most suitable for you?

- a) I will sleep only after my duty 4
- b) I will doze a little before and sleep after my duty 3
- c) I will sleep before and doze after my duty 2
- d) I will sleep totally before my duty 1

18. You have to work physically hard during 2 hours. What time would you prefer to do it if you were free enough to plan your day schedule?

- a) 8⁰⁰ – 10⁰⁰ 4
- b) 11⁰⁰ – 13⁰⁰ 3
- c) 15⁰⁰ – 17⁰⁰ 2
- d) 19⁰⁰ – 21⁰⁰ 1

19. You've decided to go be engaged in physical training. Your friend has suggested doing it together during 1 hour twice a week from 10 to 11 p.m. Is this the best time for you?

- a) I could be quite fit 1
- b) I think I could be quite fit 2
- c) It's rather late, I couldn't be fit 3
- d) Absolutely not, I couldn't do it that time 4

20. What time did you use to wake up during summer vacations in your childhood?

- a) 5⁰⁰ – 6⁴⁵ 5
- b) 6⁴⁶ – 7⁴⁵ 4
- c) 7⁴⁶ – 9⁴⁵ 3
- d) 9⁴⁶ – 10⁴⁵ 2
- e) 10⁴⁶ – 12⁰⁰ 1

21. Imagine, that you could arrange your working hours yourself. Which of the suggested periods could you have the maximal efficiency in?

- a) 00⁰¹ – 5⁰⁰ 1
- b) 5⁰¹ – 8⁰⁰ 5
- c) 8⁰¹ – 10⁰⁰ 4
- d) 10⁰¹ – 16⁰⁰ 3
- e) 16⁰¹ – 21⁰⁰ 2
- f) 21⁰¹ – 24⁰⁰ 1

22. What time do you usually reach “the top” of your working activity?

- a) 00⁰¹ – 4⁰⁰ 1
- b) 4⁰¹ – 8⁰⁰ 5
- c) 8⁰¹ – 9⁰⁰ 4
- d) 9⁰¹ – 14⁰⁰ 3
- e) 14⁰¹ – 17⁰⁰ 2
- f) 17⁰¹ – 24⁰⁰ 1

23. Sometimes we can hear about people of the morning and evening types. What type do you attribute yourself?

- a) clearly to the morning 6
- b) more to the morning than to the evening one 4
- c) more to the evening than to the morning one 2
- d) clearly to the evening 0

The work capacity type is determined by the total score:

- more than 92 points – clearly defined morning type;
- 77 – 91points – mildly defined morning type;
- 58 – 76 points – the arrhythmic type;
- 42 – 57 points – mildly defined evening type;
- less than 42 points – clearly defined evening type.

Conclusion _____

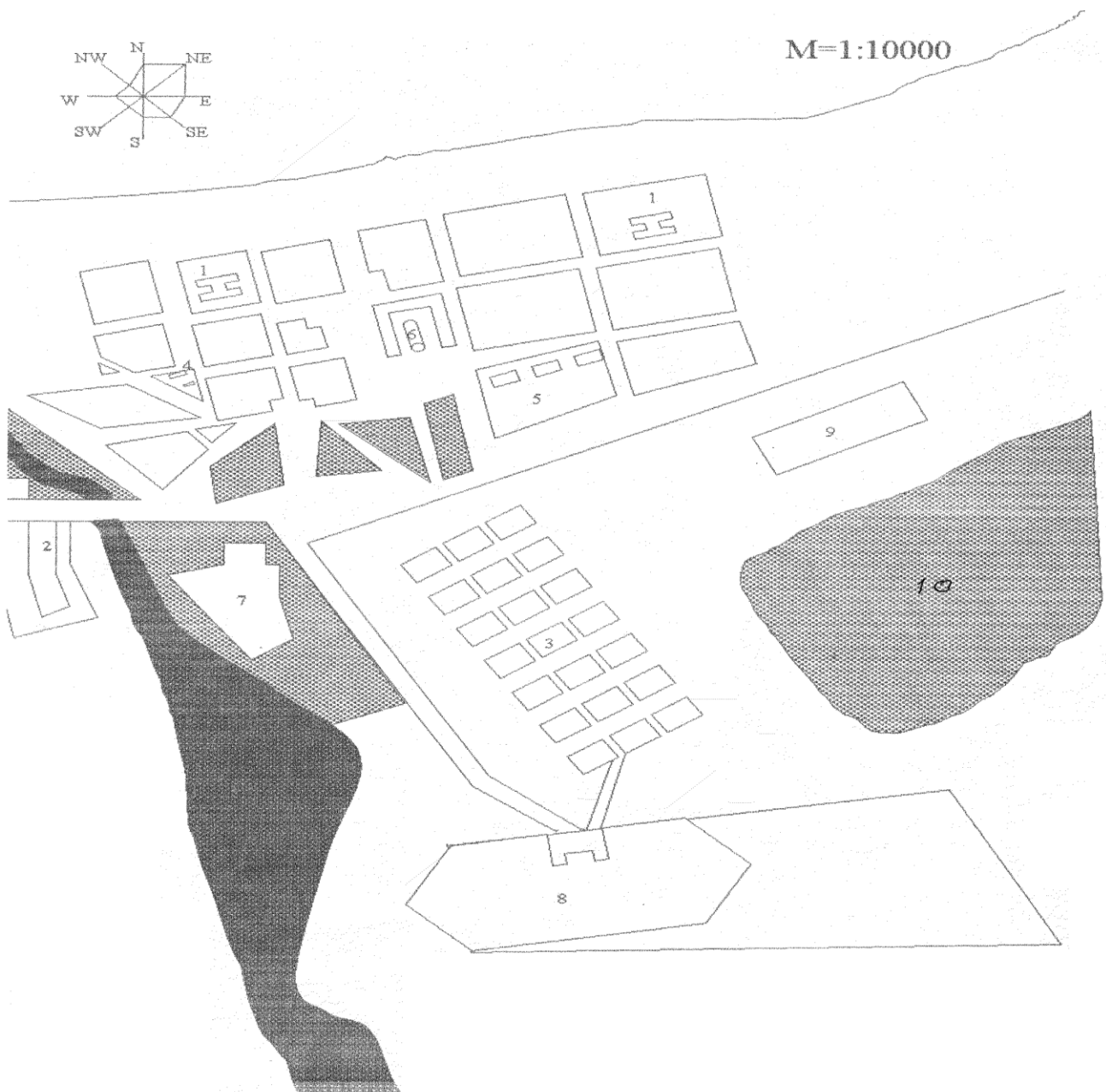
Test questions

1. Biological rhythms and human health. The biological rhythms concept. Initial conditions and development reasons of medical biorhythmology as a science.
2. Main characteristics of the biological rhythms (level, period, amplitude, acrophase, form of daily curve etc.).
3. Classifications of the most widespread biological rhythms.
4. Methods of determination of different types of biological rhythms day curves.
5. Methods of determination of human day working ability type.
6. Methods of determination of calculation biological rhythms.
7. Conception of desynchronosis as a main type of chronopathology and its medical and hygienic category. Types of desynchronosis.
8. Biorhythmological principles of the rational organization of the everyday activity. Chronohygiene as a basis of the desynchronosis prevention.

Signature
of the Teacher _____

Signature
of the Student _____

Example of situational plan of district hospital



1. The school
2. The village
3. The living houses
4. The bread bakery
5. The garages
6. The market
7. The clothing factory
8. The factory of chemical equipment
9. The hospital
10. Green plantation

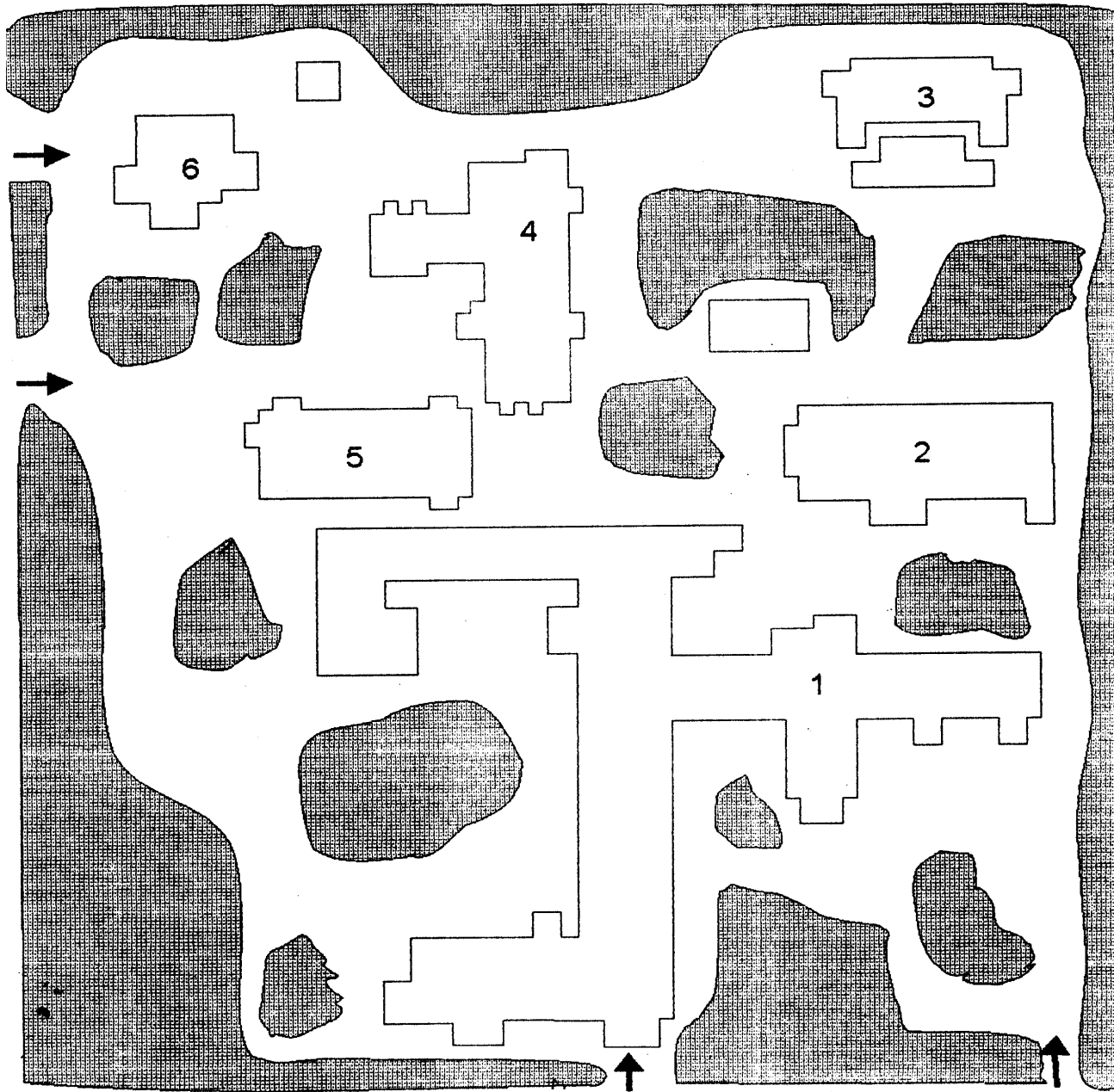
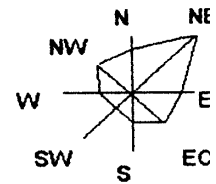
2. Sanitary and hygienic estimation of the general plan of the hospital for 320 beds.

- 2.1. The scale of the general plan:.....
- 2.2. Shape of the hospital plot.....
- 2.3. The size of the plot: length ; width
- 2.4. The ratio of width and length of the hospital plot.....
- 2.5. The area of the hospital plot.....
- 2.6. The area of the hospital plot for one bed.....
- 2.7. Presence and number of entrances to the territory of the hospital.....
.....
- 2.8. Presence of separate entrances to the morgue zone, to the economic zone and to the polyclinic zone.....
.....
- 2.9. Presence of a sufficient number of paths and passages on the hospital plot.....
.....
- 2.10. The percentage of building of the territory
- 2.11. The percentage of green plantations on the territory
- 2.12. The list and location of medical buildings and other buildings on the territory of the plot.....
.....
.....
- 2.13. Orientation of the medical building front.....
- 2.14. The correct situation of different zones on the territory of hospital (by "wind rose")
.....
.....

Conclusion:

.....
.....
.....
.....
.....
.....
.....

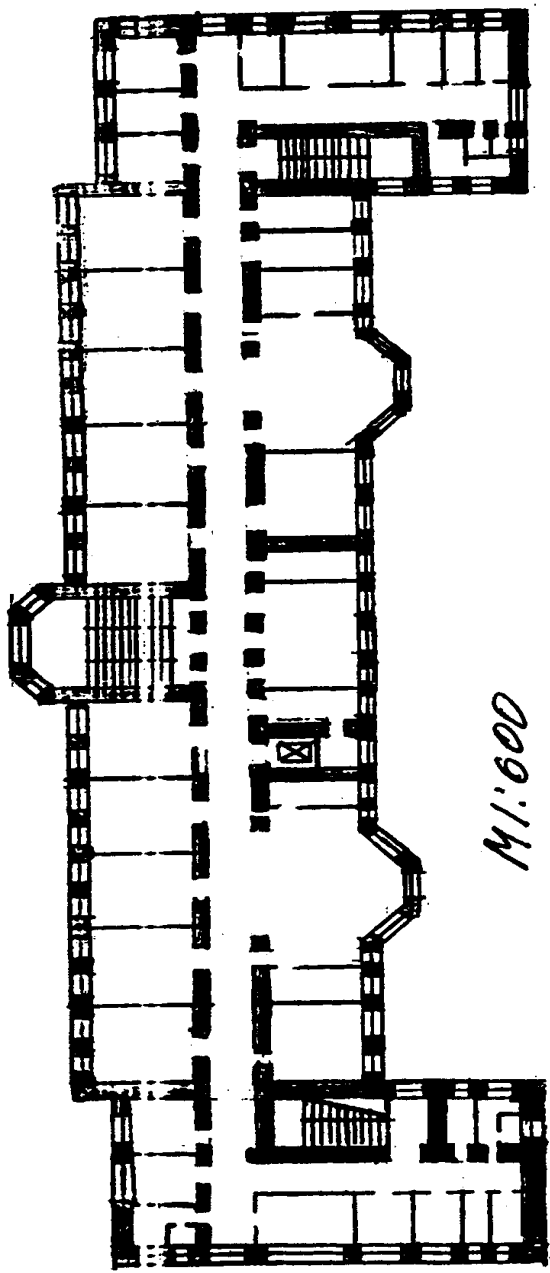
Example of general plan of district hospital



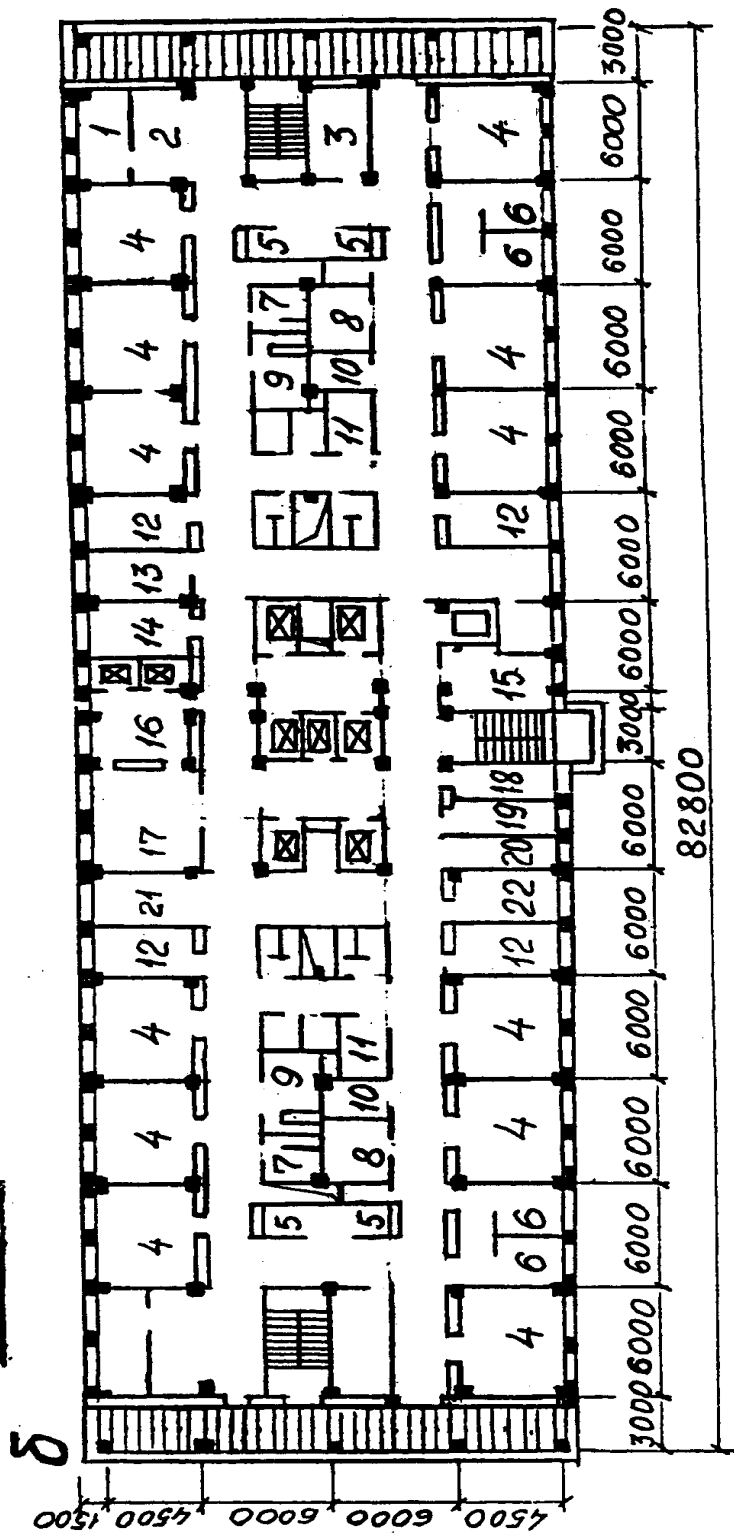
Scale 1 : 1000

1. The main medical building for 240 beds
2. Medical building for 60 beds
3. Infectious building for 20 beds
4. Administrative building
5. Food department
6. Morgue

3. Sanitary-hygienic estimation of the internal design of the hospital section	
3.1. The scale of the internal design.	
3.2. Number of beds in the ward section	
3.3. Number of the entrances to the ward section	
3.4. The type of the corridor in the ward section	
3.5. The set of main rooms for medical treatment and other rooms in the ward section	
.....	
.....	
.....	
3.6. Number and percentage of:	
3.6.1 one-bed wards in the ward section	
3.6.2 two-beds' wards	
3.6.3 four-beds' and more wards.....	
3.7. The scheme of movement of the patients in the ward section.....	
.....	
3.8. The place of sanitary sections in the ward department.....	
.....	
3.9. Possibility of the draught ventilation of the wards and others medical rooms in the ward section	
3.10. Estimation of the corridor	
3.10.1 length of the corridor	
3.10.2 width of the corridor.....	
3.10.3. area of the corridor.....	
3.10.4 The area of the corridor for one patient.....	
4. Hygienic estimation of the ward	
4.1. Length of the ward width of the ward	
4.2. Area of the ward	
4.3. Area of the ward for one patient	
4.4. Height of the ward - 3,2 m	
4.5. Volume of the ward	
4.6. Volume of the ward for one patient	
4.7. Natural lighting of the ward	
4.8.1 number of the windows in the ward -.....	
4.8.2 width of the window height of the window	
4.8.3 area of one window	
4.8.4 total area of windows (without transom) -.....	
4.8.5 Lighting coefficient	



a



The internal design of the therapeutic department

a - the ward section with a corridor of two-side building; **b**-the ward section with a two-way corridor; 1 – the sanitary treatment room; 2 the room for daily stay of patients; 3 - the dressing room; 4 - the wards for 4 beds; 5 - the post for the nurse on duty; 6 - the wards for 1 bed; 7 - the clysters room; 8 - the room for keeping the portable equipment; 9 the bathroom; 10 - the room for dirty linen; 11 – the sanitary room; 12 - the wards for 2 beds; 13 - the doctor's room; 14 - the head's room; 15 - the room for endoscope; 16 - the refreshment room; 17 - the dining room; 18 - the room for personnel; 19 - the chief-nurse's room; 20 - the nurse-manager's room; 21 - the room for daily stay of patients; 22 - the doctor's room

Subject 6. THE METHOD OF SANITARY-HYGIENIC INSPECTION OF THE MEDICAL PREVENTIVE ESTABLISHMENTS

Learning objective

- Master the knowledge on the hygienic conditions and harmful factors influencing the efficacy of patients' treatment and medical workers' health.
- Become familiar with the legislative and organizational measures of the provision of the optimal regime, hygienic conditions for patients of the in-patient departments and the medical workers' labour protection.
- Master the general scheme and methods of subjective (sanitary inspection) and objective sanitary control of the conditions of patients' stay and the conditions of medical personnel labour at the hospital.

Basics

You should know :

- Basic hygienic requirements concerning the planning, equipment, regime, exploitation of the treatment, diagnostic, accessory and consumer subdivision of the in-patient departments.
- Hygienic standards of microclimate, air, ventilation, natural and artificial lighting of different subdivisions of the medical institution, their importance in the patients' treatment efficacy and the conditions of medical personnel labour.
- Harmful and dangerous factors of different subdivisions of the medical institution (diagnostic, physiotherapeutic, balneal etc.), their influence on the patients' and medical personnel health.

You should have the following skills:

- To carry out the sanitary inspection and determine the objective figures of the hygienic condition of the medical institution different subdivisions.
- To determine and assess harmful and dangerous factors of different subdivisions of the medical institution and their influence on the patients' and medical personnel health.

**Act
of sanitary inspection of a medical preventive establishment**

1. General information.
 - 1.1. Name of the medical preventive establishment.....
 -
 - 1.2. Address of the hospital.....
 - 1.3. Number of beds in the hospital
 - 1.4. Radius of service of the hospital.....
2. Sanitary inspection of the situational plan of the hospital.
 - 2.1 Location of the hospital in the city
 - 2.2 The surrounding objects and distance to them
 -
 -
 -
 -
 -

2.3 Presence of polluted sources of the environment around the hospital and distance to them.....

3. Sanitary inspection of the general plan of the hospital.

3.1.Shape of the plot of the hospital

3.2.Length of the plot

3.3.Width of the plot.....

3.4.Ratio of the width and length of the plot.....

3.5.The area of the hospital plot

3.6.The area of the plot for one bed.....

3.7.Number of entrances to the territory.....

3.8.Presence and names of zones on the territory of the hospital.....

3.9. Presence of sufficient number of paths and passages on the hospital plot.....

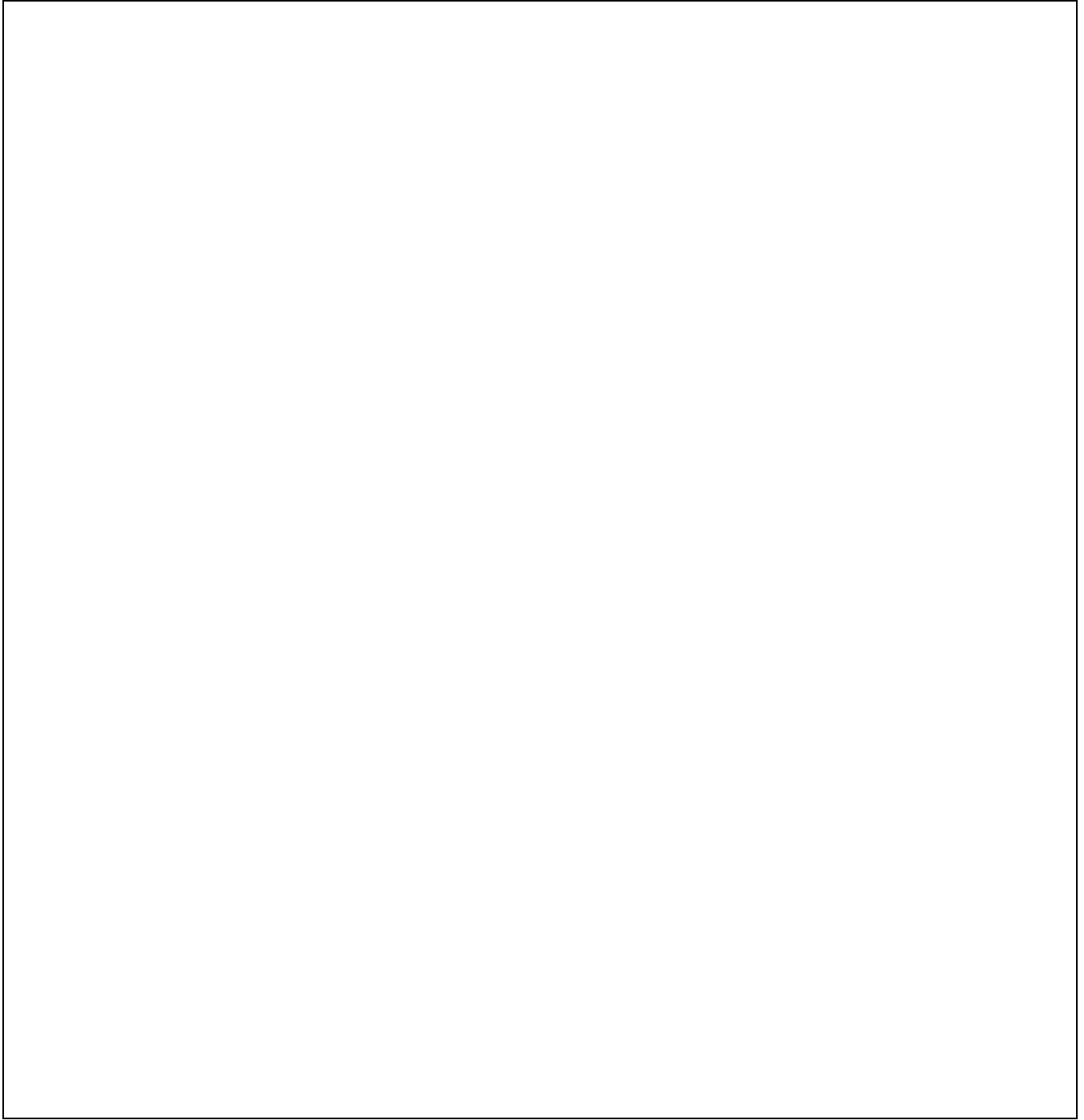
3.10. Presence of separate entrances to the morgue and economic zone.....

3.11.The percentage of building of the territory.....

3.12.The percentage of the green plantation and their location on the territory of the hospital.....

3.13. The list of medical buildings, their situation and co-situation on the territory

Scheme of general plan of hospital



Scale

.....

.....

.....

.....

.....

.....

.....

4. Hygienic inspection of the main building of the hospital.	
4.1. The system of construction of the hospital	
4.2. Orientation of the medical building front.....	
4.3. Number of stories in the main building.....	
4.4. Location of departments on the stories of the hospital	
4.4.1 on the first story.....	
.....	
.....	
4.4.2 on the second story.....	
4.4.3.....	
4.4.4.....	
4.4.5.....	
4.4.6.....	
4.4.7.....	
4.4.8.....	
4.4.9.....	
5. Sanitary inspection of the ward section	
5.1. Number of beds in the ward section.....	
5.2. Number of the entrances to the ward section.....	
5.3. Type of the corridor in the department.....	
5.4. The set of main rooms for medical treatment and other rooms in the ward section.	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
5.5. Presence and number of one-bed wards, two-beds' wards, four-beds' wards and more in the ward section.....	
.....	
.....	
.....	
5.6. The scheme of movement of the patients in the ward section.....	
.....	
.....	
5.7. The place of sanitary sections in the ward section	
.....	
5.8. Possibility of the drought ventilation of the wards and other medical room.....	
.....	

Subject 7. SANITARY-HYGIENIC INSPECTION OF FOOD DEPARTMENT OF HOSPITAL

Learning objective

- To strengthen the students' knowledge of the hygienic requirements to food department

Basics

You should know :

- The main sanitary-hygienic requirements to location of food department.
- Sanitary requirements to the internal planning and to the equipment of a food department
- Hygienic requirements to culinary treatment (cooking) of food products.

You should have the following skills:

- To carry out the sanitary-hygienic inspection of food department,
- To perform the act of sanitary- hygienic inspection of food department with conclusion.

1. Site of a building of food department in terrain of the ground area of hospital.....

.....
.....
.....

2. Keeping of the sanitary demands to the terrain of zone of the food department (regimen of a sweeping; architecture of gathering of dust; the device of garbage collector, of unload holes, their clearing and disinfection).....

.....
.....
.....
.....

3. The set of the basic and supplementary locations which are included in food department, their square, and height.....

.....
.....
.....
.....

4. Intrinsic design of food department. Keeping of a principle "streaming" (sequence of technological processes; lack of opposing streams of alimentary raw material and ready nutrition)

.....
.....

.....
.....
.....
.....
5. Regimen of a streaming sweeping of locations of food department. Keeping of a regimen of sanitary day. Disinfection of floors, walls, doors etc. Presence, nomenclature, condition of a storage and marking of harvest stock.....
.....
.....
.....

6. Arrangement of the technological equipment in the basic locations of food department.....
.....
.....
.....
.....

7. Performance of the technological equipment (finishing tables, chopping boards, knives, intrafactory tare).....
.....
.....
.....
.....

8. Condition of storage and marking of finishing tables, boards, knives etc.....
.....
.....
.....
.....

9. Sequence of the collecting of a wastage and dust in industrial locations of food department.....
.....
.....

10. Regimen of washing kitchen and restaurant utensils, glasswares and tablewares

11. Correspondence of foodstuff acting on the food department, demands of the working normative-engineering specifications. Presence of the accompanying documents certifying quality of products, with the indicating of date and hour of development of perishable food, and also date and hour of a total elapsed time of their storage

12. Category of acting on the food department of meat and eggs. Presence of a marking

13. Keeping rules of a commodity neighborhood at a storage of products in cold storage rooms.

14. Marking cold storage rooms on aspects of products, stored in them.

15. Keeping the demands to culinary handling of foodstuff.

16. Keeping terms and temperature schedule of storage of ready dishes.

17. Keeping about taking out of assays of ready dishes and support of journal.

18.Measure on struggle with insects and gnawers on the food department.....

19.Keeping the demands to transportation of foodstuff from bases supplying hospital, on the food department and transportation of ready nutrition from food department in abjointings of hospital

20.Water supply, water drain, heating and ventilation on the food department.....

21. Air-thermal regimen on the food department.....

22.Natural and artificial illumination on the food department.....

23.Timeliness of transit of medical surveys by the personnel of the food department.

Presence and regularity of support of the sanitary books

24. Keeping by the personnel of the food department of the demands of personal hygiene

.....
.....
.....

25. Presence on the food department of the first-aid set with a necessary panel of medicines.....

.....
.....
.....
.....
.....

Conclusion.....

.....
.....
.....
.....
.....

Test questions

1. Sanitary requirements to the territory of a food department location.
2. Sanitary requirements to the internal planning of a food department.
3. Sanitary requirements to the equipment of a food department.
4. Hygienic requirements to culinary treatment (cooking) of food products.
5. Hygienic requirements to the regime of plates and other utensils washing.
6. Personal hygiene of the staff of a food department (preliminary examination, periodical survey).

Signature of
the Teacher _____

Signature of
the Student _____

Subject 8. SANITARY INSPECTION OF RADIOLOGICAL DEPARTMENT OF HOSPITAL

Learning objective

- Extend, methodize and strengthen knowledge on radiation hazard for personnel and patients of patient care institutions during usage of radioactive nuclides and other sources of ionizing radiations in diagnostic and treatment purposes, on principles and ways of radiation protection.
- Master methods and ways of radiation control of labour conditions of personnel and protection of patients in radiological departments of hospitals.

Basics

You should know :

- Ways of use of radioactive nuclides and other sources of ionizing radiations in hospitals with diagnostic and treatment purpose.
- Peculiarities of biological effects of ionizing radiation.
- Essence of radiation hazard during working with radionuclides and other sources of ionizing radiation.

You should have the following skills:

- To measure and assess parameters which characterize radiation environment in work and adjacent premises and individual doses of personnel during work with radionuclides and other sources of ionizing radiation.
- To carry out sanitary inspection of radiological departments of hospitals.

1. General characteristic of radiological department of hospital

1.1. Name of patient care institution, its departmental submission and address

.....

.....

.....

1.2. Characteristic and assessment of allocation of building of radiological department on the area, type of building, presence of zone of unavailability, presence of control area, its measures.....

.....

.....

.....

1.3. Structure of department, peculiarities of allocation and planning of its subdivisions, functional connection between them.....

.....

.....

.....

.....

.....

1.4. Assessment of radiation environment on territory of control zone and outside of it by determination of absorbed dose rate in the air of γ -radiation

2. Department of teletherapy.

2.1. Allocation and planning of department, basic premises, characteristic of devices used for radiotherapy

2.2. Radiation protection of control room, adjacent premises and territory from γ -radiation (presence of protective shroud on radiating device, materials and thickness of walls in treatment room, presence of protective labyrinth at entrance, protective doors, their prohibition, presence of attentive light alarm).....

2.3. Observing system for irradiation of patients.....

2.4. Characteristic and estimation of ways of protection of patients from side irradiation.....

2.5. Assessment of effectiveness of radiation protection in control room and other adjacent premises by calculation method and by measurement of absorbed dose rate in the air.....

3. Departments for treatment by sealed sources.

3.1. Allocation and planning of department.....

.....
.....
.....

3.2. Sources of irradiation that used in department, their activity, methods of application of sources to patients (manual-linear and consistent).....

.....
.....
.....

3.3. Characteristic of radiation dangerous premises (depository for sources of irradiation, radiomanipulation room, radiotreatment room), their accordance to hygienic requirements.....

.....
.....

3.4. Conditions of storage and transportation of sources of irradiation.....

.....
.....
.....

3.5. Ways of radiation protection of personnel in depository for sources of irradiation, radiomanipulation room, radiotreatment room.....

.....
.....
.....

3.6. Radiation protection of adjacent premises and territory.....

.....
.....
.....

3.7. Assessment of effectiveness of radiation protection by necessary calculations and measurement of absorbed dose rate in the air of workplace, behind shields, in adjacent premises, on adjacent territory.....

.....
.....
.....

4. Department for treatment by open sources.

4.1. Allocation of department, characteristic of use of radioactive nuclides, class of it's radiation hazard

.....
.....
.....

4.2. Characteristic of radiation dangerous premises (depository of radioactive nuclides, packing room, treatment room, washing room, radiological wards) their accordance to permitted class of works, sanitary improvement (covering of walls, floor; exhaust hoods, ventilation, collection, removal and deactivation of solid and liquid radioactive waste).....

.....
.....
.....
.....

4.3. Presence of means of radiation protection: protective shields, boxes, remote instruments.....

.....
.....
.....
.....

4.4. Presence of individual radiation protection devices for personnel: working clothes, overalls, aprons, arm-bands, breathing masks and others.....

.....
.....
.....
.....

4.5. Sanitary and domestic premises for personnel.....

.....
.....

4.6. Results of measurements and assessment of level of radioactive pollution of workrooms and other premises.....

.....
.....

5. Acquaintance with documentations of radiological department, its types Analysis and assessment of materials of radiological and medical control during previous year and current year

6. Conclusions.

Test questions

1. Ionizing radiation as occupational hazard for personnel of hospitals.
2. Ionizing radiation as risk factor for patients of hospitals during radiology and nuclear diagnostic and treatment procedures.
3. Structure of radiological department of hospital. Peculiarities of radiological hazard and radiation protection in each organization department (bare, sealed sources, long-focus therapy).
4. Ways of decreasing of radiation exposure of personnel and patients of patient care institutions. Sanitary and technical equipment of radiological departments.
5. Methods of collection and sterilization of radioactive waste during work with bare sources of ionizing radiation.
6. Methods and ways of sanitary control and survey during work with sources of ionizing radiation in patient care institutions.

Signature of
the Teacher _____

Signature of
the Student _____

Subject 9. SANITARY-HYGIENIC INSPECTION OF AN X-RAY ROOM

Learning objective

- Master methods and ways of radiation control of labour conditions of personnel and protection of patients in X-ray departments of hospitals..

Basics

You should know :

- The peculiarities of the placement and internal design of X-ray room,
- Peculiarities of sanitary-hygienic and medical protective regimen in X-ray room.

You should have the following skills:

- To carry out the sanitary - hygienic inspection of the X-ray room.
- To perform the act of sanitary - hygienic inspection of the X-ray room

Act

of sanitary-hygienic inspection of the X-ray room

1. Location of the X- ray room in an inpatient and outpatient complex.

.....
.....
.....
.....
.....

2.The set of premises of the X-ray room and their size in m²

.....
.....
.....
.....
.....

3. The height of the X-ray premises.....

4.Neighbouring premises.....

.....
.....
.....

5. Character of the X-ray apparatus mounted in the room, its factory number, year of production.....

.....
.....

6. Character of stationary means protection (walls, top and bottom, doors, windows, stuff of the floor). Individual means of protection (a large protective screen, a small protective screen, on-chest apron from leaden rubber, leaden gloves and an under-shield apron)

.....
.....
.....

7. Individual means of protection (a large protective screen, a small protective screen, on chest apron from leader rubber, leaden gloves and an under-shield apron).....

.....
.....
.....

8. Character of the microclimate in the premises of the X-ray room

.....
.....
.....

9. Character of the natural and artificial lighting in the X-ray room.....

.....
.....
.....

10.Character of the ventilation and heating system in the X-ray room.....

.....
.....
.....

11.Character of water supply and sewerage in the X-ray room

.....
.....
.....

12.Presence of grounding of the equipment.....

.....
.....
.....

13.The technical state of the equipment

.....
.....
.....

14. Results of dosimetry

.....
.....
.....

15. Presence of the documents (a passport of the X-ray room, a control-technical log book, protocols of measurement of the protection quality, exposition and scheme of the X-ray room, safety rules)

.....
.....
.....

16. The order of the control of radiative loads on the patients.....

.....
.....
.....

Scheme of location and internal design of the X-ray room

.....

.....

.....

.....

17. Conclusion.....

.....

.....

.....

.....

.....

.....

.....

.....

Test-questions

1. The basic aspects of radiative monitoring in radiological departments and X-ray room.
2. Characteristics of radiological hazard in X-ray diagnostic room and conditions it depends on.
3. Ways of decreasing of radiation exposure of personnel and patients of patient care institutions. Sanitary and technical equipment of X-ray room.
4. The main principles of radiative asepsis.
5. The basic principles of a radiative protection of the personnel of medical establishments at work with "close" sources of ionizing radiations.
6. The procedure of sanitary-hygienic inspection of X-ray room.

Signature of
the Teacher _____

Signature of
the Student _____

Subject 10. HYGIENE ESTIMATION OF TROPICAL CLIMATE, ITS INFLUENCE ON THE LIVING CONDITION, WORK ABILITY AND POPULATION HEALTH

Learning objective

- To learn hygienic peculiarities of living and work conditions of people in hot and tropical climatic zones.
- To master method of estimation of organism thermoregulation and heat metabolism in hot and tropical conditions.
- To study main kinds of people pathology in hot and tropical countries.

Basics

You should know:

Physiological peculiarities of thermoregulation in the conditions of overheating microclimate and its influence on the human health.

You should have the following skills:

- To determine parameters of microclimate and their influence on the human body.

Situational task № 1

Builders work the hostel in the town of one of a countries with tropical climate. Air temperature on the working place is $+37^{\circ}\text{C}$, relative humidity 98%, air movement is 1.0 m/s. What regimen of work and rest must be for these workers?

Solution of situational task

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Situational task № 2

Team of agricultural workers work on the plantation for growing sugar-cane in one from countries of Caribbean basin, in summer (August).

Heat production of these workers (M) is 310 kcal/hour. An average radiant temperature of the environment: reading of black spherical thermometer (t_{sph}) is $+42^{\circ}\text{C}$, reading of dry thermometer (t_{dry}) is $+38^{\circ}\text{C}$, air movement (V) is 0.1 m/s, maximum air humidity (p) is 48 Hg mm.

Calculate thermal load on these workers and make up hygienic conclusion.

Solution of the situational task

2.1. Calculation of loss (-) or income (+) of heat through radiation (R) by the formula

$$R = H \cdot (t_{\text{sph}} - 35) \text{ kcal/h}$$

$$R = 11 \cdot (\dots - 35) = \dots \text{ kcal/h}$$

2.2. Calculation of loss (-) or income (+) of heat through convection (C) by the formula:

$$C = 6 \cdot V^{0.6} \cdot (t_{\text{dry}} - 35) \text{ kcal/h,}$$

where $V^{0.6}$ is in the table

V, m/s	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
$V^{0.6}$	0.17	0.25	0.38	0.49	0.58	0.66	0.74	0.81	0.87	0.94	0.99

$$C = 6 \cdot \dots \cdot (\dots - 35) = \dots \text{ kcal/h}$$

2.3. Calculated of maximum heat loss by sweat evaporation

$$E_{\text{max}} = 12 \cdot V^{0.6} \cdot (42 - p) \text{ kcal/h}$$

$$E_{\text{max}} = 12 \cdot \dots \cdot (42 - \dots) = \dots \text{ kcal/h}$$

2.4. Calculation of Heat-Load Index (HL) according to Belding and Tatch calculation.

$$HL = M + C + R - E_{\text{max}} \text{ (kcal/h),}$$

where: M - intensity of metabolism during work;

R – heat exchange through radiation, kcal/h;

C - heat exchange through convection, kcal/h;

E_{max} - maximum acceptable heat loss through sweat evaporation, kcal/h.

$$HL = \dots + \dots + \dots - \dots = \dots \text{ kcal/h}$$

Conclusion

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Test questions

1. Hygienic characteristics of climate and weather of hot and tropical altitudes.
2. Hygienic peculiarities of solar radiation in tropical altitudes.
3. Hygienic peculiarities of daily and season osculation of air temperature, radiant temperature, humidity, air movement.
4. Influence of meteorological conditions on the metabolic and other physiological functions of human body.
5. Hygienic character of climate of savannas, steppes arid zones (dry disserts), wet tropical wooden (humid tropical climate).
6. Diseases connected with hot and tropical climate their prophylaxis.
7. Adaptation and acclimatization of men in hot and tropical climate.
8. Personal hygiene in hot and tropical climate (hygiene of skin, clothes; hygienic regimen of day).
9. Peculiarities of planning and building populated areas in hot and tropical climate.
10. Hygiene of water and water supply sewerage system, removing and decontamination of solid waste.
11. Hygiene of dwelling in hot climate.
12. Hygienic requirement to natural and artificial illumination of living and public premises.
13. Air conditioning living, public and industrial premises. Methods of optimization of microclimate in hot and tropical climatic zones.
14. Specific character of building materials which are used in hot and tropical countries.
15. Peculiarities of organization of work regimen in conditions of arid and humid tropical zones.
16. Parameters of microclimate when physical work is impossible.
17. Calculated methods of tropical climate estimation.

Signature of
the Teacher _____

Signature of
the Student _____

**Subject 11. WATER AND WATER SUPPLY HYGIENE
IN TROPICAL CLIMATE CONDITIONS**

Learning objective

- Learn the peculiarities of tropical regions water supply.
- Master the medical control methods of hot and tropical regions water supply and prevention of waterborne diseases.

Basics

You should know:

- The hygienic and epidemiological water significance in tropic conditions.
- Methods and measures of sanitary inspection of tropic regions population water supply.

You should have the following skills:

- To examine water supply sources, select water samples for laboratory analysis taking into account tropic conditions. (sample preserving)
- To assess the water laboratory analysis results.

Situational task

Using international water standard (IWS –73), decide if water from water-pump of river water-tower is suitable for drinking with the following laboratory results:

- transparency – 15 cm
- turbidity – 5.5 units
- colour – 35⁰C
- taste – “fish” 3 points
- odour – “fish” 3 points
- temperature – 22⁰C
- pH – 6.5
- dry residue – 250 mg/l
- general hardness – 1.5 mg-equiv./l
- iron – 0.5 mg/l
- fluorine-ion – 1.2 mg/l
- copper – 0.1 mg/l
- manganese – 0.08 mg/l
- oxidizing ability – 8 mg O₂/l
- ammonia nitrogen – 0.35 mg/l
- nitrite nitrogen – 0.03 mg/l
- nitrate nitrogen – 55 mg/l
- microbial number – 220
- coli-titer – 16

Average water consumption by population of this locality is 6 l per day.
If necessary, suggest methods of water quality improvement.

Solution of situational task

1. The general conclusion about quality of the drinking water under study. Is the water potable or not potable?

.....
.....
.....
.....
.....
.....

2. Are there signs of pollution of the drinking water with organic substances?

.....
.....
.....
.....
.....

3. Are there any organic substances of animal or vegetable origin?

.....
.....
.....
.....

4. When was the drinking water polluted?

.....
.....
.....
.....

5. Are there any changes of mineral composition of the drinking water? Show the signs

.....
.....
.....
.....
.....
.....

6. What hygienic and sanitary measures must be taken for improving quality of the drinking water?

.....
.....
.....
.....
.....

Conclusion

.....
.....
.....
.....
.....

List the decentralized water supply sources in arid and humid tropical areas and protective measures against their pollution.

.....
.....
.....
.....
.....
.....
.....
.....

Test questions

1. Physiological functions of water (structural, exchanging, transporting, excretory, heat exchanging etc.) and their peculiarities in tropic conditions.
2. Epidemic and endemic waterborne diseases of arid and humid tropic regions.
3. Human body dehydration in tropical climate, its signs and symptoms.
4. Scientific substantiations of norms of physiological, residential, industrial water requirements and their peculiarities in tropical regions.
5. Hygienic requirements to water quality and their peculiarities in tropical conditions.
6. Organoleptical and chemical characteristics of water, their hygienic significance and peculiarities in tropical regions water.
7. Organoleptical, chemical, bacteriological, toxicological water pollution indices, their peculiarities in tropical conditions.
8. International water quality standards and peculiarities of their usage in tropical conditions.
9. Hygienic characteristic of water recourses and water supply sources in arid and humid tropical areas.
- 10 Hygienic characteristic of methods and means of purification, disinfection, special water conditioning methods in tropical conditions.
- 11 Methods and organization of drinking water quality sanitary control in cases of centralized and decentralized water supply in developed countries of tropical regions and in developing counties.
12. Sanitary examination methods of water supply sources, water sampling for laboratory analysis and their results assessment. Water sample preservation methods in hot climate conditions.

Signature of
the Teacher _____

Signature of
the Student _____

Subject 12. HYGIENIC, TOXICOLOGICAL AND EPIDEMIOLOGICAL PECULIARITIES OF NUTRITION IN TROPICAL REGIONS

Learning objective

- Learn the social and hygienic, toxicological and epidemiological nutrition peculiarities of tropical regions population.

Basics

You should know:

- Basics and conditions of rational nutrition and ways of its realization in tropical climate.
- Food poisonings classification and their peculiarities in hot and tropical regions.
- Alimentary diseases and foodborne infections typical for hot and tropical regions.

You should have the following skills:

- To carry out medical control of nutrition sufficiency and safety, use methods and measures for prevention of diseases among certain population groups in tropical regions.

Situational task 1.

1. A worker of cotton plantation is 170 cm height, he lost 4 kg of weight during last month (30 days). The ideal theoretical body mass for this height is 70 kg. The worker performs physical work of medium intensity and receives 2 500 kcal intake. Calculate how many calories the intake should be increased by to compensate his body weight loss.

.....
.....
.....
.....
.....
.....
.....

Situational task 2.

Estimate proteins and fats sufficiency of 25 years old woman which is worked in textile-factory if it is known that her weight is 60 kg, middle subcutaneous thickness is 5 mm, according data of urea clinical analysis urea nitrogen is 14 mg/100ml, total nitrogen in urine - 17 mg/100ml

1. Protein nutrition index

$$\text{PNI} = \frac{N_1}{N_2} =$$

Where N_1 - urea nitrogen
 N_2 - total nitrogen in urine

Proteins sufficiency _____

2. Fat sufficiency

$$D = M \times C \times 6.32 =$$

where: D - fats amount in g;

M- middle subcutaneous thickness in mm (it is determined under lower angle of the right scapula, on the back surface of the right shoulder and on the side surface of belly);

C - body surface in m²

Level of fat sufficiency

Conclusion

.....

.....

.....

.....

.....

.....

.....

Test questions

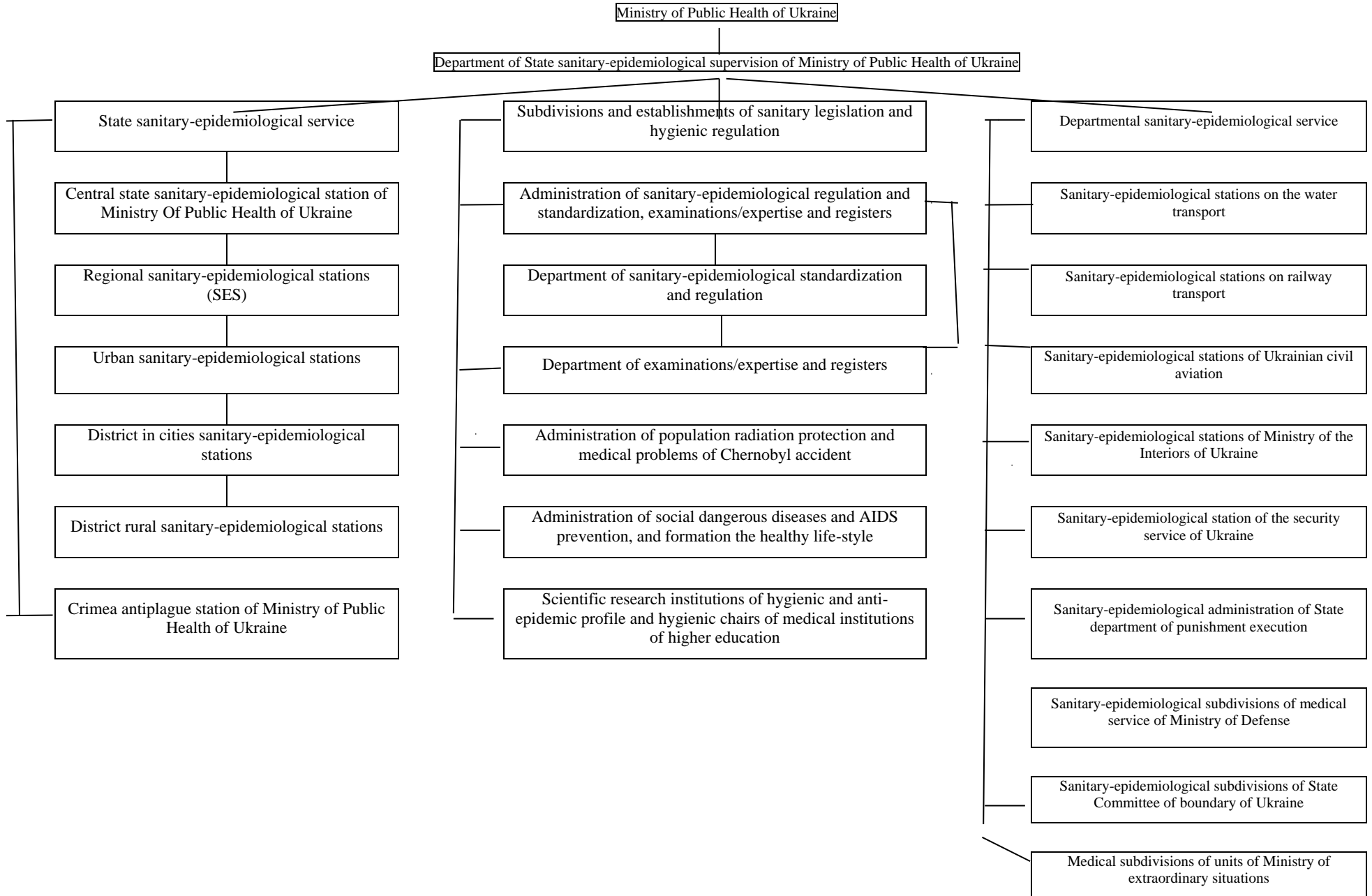
1. Rational nutrition and conditions of its provision.
2. Physiological and hygienic basics of rational nutrition in tropical conditions.
3. The importance of main nutrients (proteins, fats, carbohydrates, vitamins, mineral salts, microelements, taste substances (spices) in nutrition of tropical regions population.
4. Hygienic characteristics of food products, used by population of arid and humid tropical regions.
5. General characteristic of alimentary diseases of tropical regions population.
6. Malnutrition and complete starvation diseases, vitamin deficiency diseases among tropical regions population.
Overeating diseases in tropical regions.
7. Diseases caused by poor quality of food intake (foodborne diseases, helminthosis, food poisoning, enzymatic deficiency).
8. Methods of medical control over tropical regions population nutrition.
9. Calculation methods of the population nutrition assessment. Alimentary calorimetry method.
10. Food products storage and preservation peculiarities in tropical conditions, usage of preservatives and antibiotics.
11. Methods and measures of prevention of the foodborne diseases, infections and invasions with alimentary transmission mechanisms, food poisoning.

Signature of
the Teacher _____

Signature of
the Student _____

INFORMATION AND REFERENCE MATERIALS

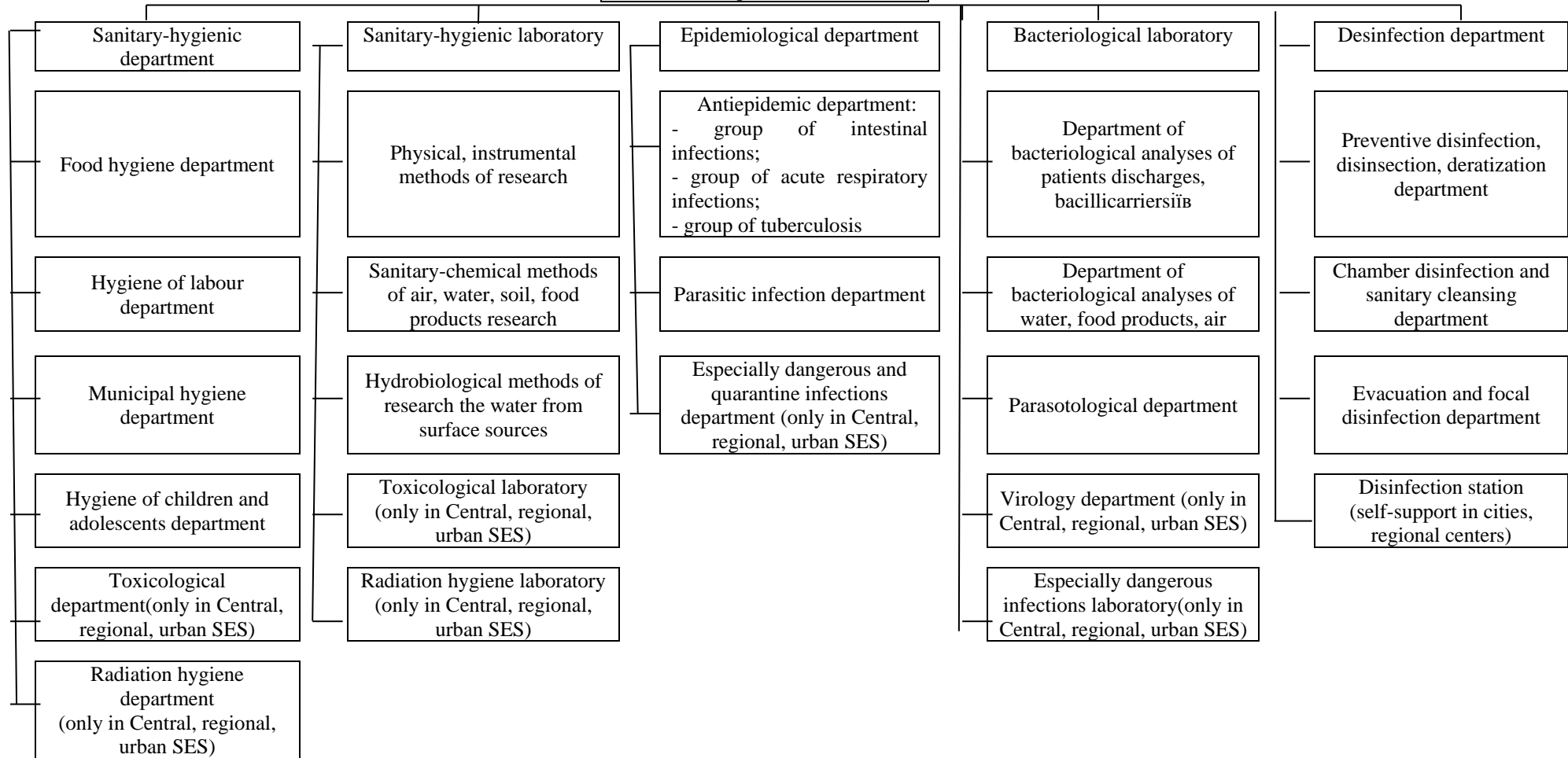
STRUCTURE OF SANITARY-EPIDEMIOLOGICAL SERVICE IN UKRAINE



Structure of sanitary-epidemiological stations of different authority levels

Chief State sanitary doctor (corresponding Central, regional, urban or district SES)

Organization and methodical department



Scientific research institutions of hygienic and antiepidemic profile in Ukraine

hygienic profile

antiepidemic profile

O.M. Marzeev institute of hygiene and medical ecology (Kyiv)

L.I. Gromashevsky scientific-research institute of epidemiology and infectious diseases of AMS of Ukraine (Kyiv)

Scientific research institute of labour medicine of AMS of Ukraine (Kyiv)

Zabolotniy Institute of microbiology of National Academy of Science (Kyiv)

Scientific research institute of social medicine and public health organization of Ministry of Public Health of Ukraine (Kyiv)

Lviv scientific-research institute of hygiene and microbiology of AMS of Ukraine

Scientific research institute of pharmacology and toxicology of AMS of Ukraine (Kyiv)

I.I. Mechnikov scientific-research institute of microbiology and immunology of AMS of Ukraine (Odesa)

Kharkiv scientific-research institute of labour medicine of AMS of Ukraine

Krivoi Rog scientific-research institute of labour medicine of AMS of Ukraine

Odesa scientific-research institute of transport medicine of AMS of Ukraine

Simpheropol scientific-research institute of balneotherapy of AMS of Ukraine

L.I. Medvid institute of ecohygiene and toxicology of Ministry of Public Health of Ukraine (Kyiv)

Donetsk scientific-research institute of labour medicine of AMS of Ukraine

**Efficiency of domestic sewage purification
on different constructions and stages of purification**

Type of purification	Efficiency of domestic sewage purification				
	Suspended particles	Biochemical need in oxygen	Oxidation	Microbial number	Number of helminth's eggs
Mechanical purification (two-tiered settling tank)	50-70	25-30	-	25-50	70-90
Biological purification (aerotank)	70-90	70-90	70-75	90-95	100

The sizes of area of plot for hospitals

Number of beds in hospital	The area of plot per bed (m ²)
<50	300
50-100	300-200
100-200	200-140
200-400	140-100
400-800	100-80
800-1000	80-60
>1000	60

Area of wards per patient in hospital

Department	Area of wards (m ²)
Infectious and tuberculous (for adults)	8
Infectious and tuberculous (for children)	7
Recovery treatment, radiological	10
Intensive therapy	13
Noninfectious (for adults)	7
Noninfectious (for children)	6
For children till one year	3
Psychoneurologic	6-7

Recommended orientation of windows in hospital premises

Premises	Geographical latitude		
	Southern of 45° N.L.	Limited in 45-55° N.L.	Northern of 55° N.L.
Operating rooms, rooms for resuscitation, sectional rooms, delivering rooms	N, NE, NW	N, NE, NW	N, NE, E, NW
Wards for patients with tuberculosis and other infectious diseases	S, SE, E, NE, NW	S, SE, E, NE, NW	S, SE, SW
Wards for intensive therapy, department for children to 3 years old, playing rooms for children's department	Not admitted to West, wards for intensive therapy to West and South – West		
Laboratories for bacteriological researches, for receiving infectious materials and its checking.	N, NE, NW, SE, E	N, NE, NW, SE, E	N, NE, NW, SE, E

List and areas of main premises of wards section and department

Premises	area in m ²
One bed wards	9-16
Two beds wards and more	3-13 for one bed
Semibox (box) for 1 bed	22
Box for 2 beds	27
Consulting room	10
Premise for nurse	6
Toilet for patients	3-6
Procedure room	12-22
Room for personal hygiene	5
Bath with shower	12-14
Room for day rest	0.8-1
Room for keeping analysis materials	3
General premises of non-infectious department for adults	
Head room	12
Bandage room	22
Room for nurse	12
Storage room for portative technical	12-20
Refreshment room	18-22

Hygienic norms of microclimate in the different rooms of hospital

	Name of the room	Parameters of the microclimate		
		T°, C	RH, %	V, m/s (not more then)
1	Hospital room for adults	20	30-60	0.2 - 0.3
2.	Hospital room for children	22	30-60	0.2-0.3
3.	Operating room	22-24	30-60	0.2-0.3
4.	Newborn's room	25	30-60	0.2-0.3

Level of natural illumination with side (lateral) illumination of the hospital premises, %

Premises	In zone with steady snow covering	On the rest territory of the country
Operating rooms, delivering rooms, section rooms	1.6	2
Bandage rooms, consulting rooms, laboratories, assistant's rooms, wards for intense therapy	0.8	1
Wards, premises for day rest, procedure rooms	0.4	0.5
Refreshment rooms, rooms for visitors, X-ray and physiotherapeutic rooms	0.4	0.5

Hygienic norms of artificial lighting for different hospital premises

Premises	artificial lighting (lux)	
	Incandescent lamps	Fluorescent lamps
Operating rooms	200	400
Other premises of operating block	150	300
Doctor's office	100	200
X-ray room	30	75
Boxes, isolating rooms	75	150
Wards	75	150
Diagnostic laboratories	250	500

Maximum allowable equivalent-effective temperature (EET) indices.

<i>Labour mode</i>	<i>Labour intensity</i>		
	light	medium	hard
Without breaks during the shift	30.4	28.9	26.1
With breaks:			
-every 3 hours	32.7	29.9	27.6
-every 2 hours	33.3	31.0	29.9
-every 1 hour	35.0	32.7	30.4
-every 30 min	38.2	35.5	34.4
- every 20 min	40.5	37.7	35.0
For people acclimatized to high temperature	32.2	29.4	28.9
For non-acclimatized to high temperature people	30.2	27.4	26.9

Protein sufficiency of human organism

Protein nutrition index	Level of protein sufficiency
95-90	Adequate
90-85	sub adequate
85-80	Low
80-70	sub compensated
70-30	Insufficient
30-25	significant disorder

Determination of human body surface by weight

<i>Body mass in kg</i>	<i>Body surface, m²</i>	<i>Body mass in kg</i>	<i>Body surface, m²</i>
10	0.482	60	1.729
20	0.834	70	1.922
30	1.19	80	2.098
40	1.323	90	2.263
50	1.535	100	2.518

International Water Standard (IWS-73)

<i>Indices</i>	<i>LPC</i>	<i>MAC*</i>
Turbidity	to 5 units	to 25 units
Color	to 20 °C	to 20 °C
Taste and odour	to 2 points	to 2 points
Temperature	+ 8 - +12°C	+ 10 - +14°C
Active reaction pH	7 – 8.5	6.5 – 9.2
Solid residue	to 1 000 mg/l	2 000 – 3 000 mg/l
General hardness	2 mg equiv/l	10 mg equiv/l
Iron in water blue by eosin	0.3 – 0.5 mg/l	0.3 – 0.5 mg/l
Iron in city water	0.1 mg/l	1 mg/l
Chlorides	to 350 mg/l	600 mg/l
Sulfates	400 – 500 mg/l	400 mg/l
Nitrates per nitrogen	to 10 mg/l	11 mg/l
Fluorides	0.5 – 1.5 mg/l	0.8 – 1.7 mg/l
Copper	0.05 mg/l	1.5 mg/l
Manganese	0.05 mg/l	0.5 mg/l
Oxidation	2 – 3.4 mg O ₂ /l	2 - 4 mg O ₂ /l
Nitrites per nitrogen	to 0.002 mg/l	to 0.002 mg/l
Microbial number	100 in 1 ml	100 in 1 ml
Coli-index	not more than 3	-
Coli-titre	not less than 300	-

* MAC – maximum acceptable concentrations.

Professional groups of workers

1st group	Workers occupied with mental work Engineers, teachers, physicians (except surgeons), chiefs of enterprises, scientific workers, secretaries, students, managers of industrial enterprises, literature workers, businessmen, controllers, laboratory assistants.
2nd group	Workers occupied with light physical work Coaches, workers of automatic industrial process, clothing-industry workers, agronomists, salespeople, stock-breeders, junior nurses, trainers, nurses.
3rd group	Workers who physically occupy with not hard work Drivers, cooks, shoe-makers, surgeons, fitters, adjusters, chemists, textile-workers, workers of public nutrition, salespeople in food shops, water-transport workers, railway men.
4th group	Workers occupied with hard physical work Dockers, builders, metallurgists, riggers, miners, steel-makers, foundry men.

Daily caloric value and quantity of proteins, fats and carbohydrates for different professional groups of population (men)

Professional groups	Coefficient of physical activity	Age	Caloricity	Proteins (g)		Fats(g)	Carbohydrates (g)
		(years)	Kcal	Total	Animal origin		
I	1.4	18-29	2450	67	37	68	392
		30-39	2300	63	35	64	368
		40-59	2100	58	32	58	336
II	1.6	18-29	2800	77	42	78	448
		30-39	2650	73	40	74	424
		40-59	2500	69	38	69	400
III	1.9	18-29	3300	91	50	92	528
		30-39	3150	87	48	88	504
		40-59	2950	81	45	82	472
IV	2.3	18-29	3900	107	59	100	624
		30-39	3700	102	56	100	592
		40-59	3500	96	53	97	560

**Daily caloric value and quantity of proteins, fats and carbohydrates for
different professional groups of population (women)**

Professional groups	Coefficient of physical activity	Age	Caloricity	Proteins (g)		Fats(g)	Carbohydrates(g)
		(years)	Kcal	Total	Animal origin		
I	1.4	18-29	2000	55	30	56	320
		30-39	1900	52	29	53	304
		40-59	1800	50	28	51	288
II	1.6	18-29	2200	61	34	62	362
		30-39	2150	59	32	60	344
		40-59	2100	58	32	59	336
III	1.9	18-29	2600	72	40	73	416
		30-39	2550	72	39	71	408
		40-59	2500	69	38	70	400
IV	2.2	18-29	3050	84	46	85	488
		30-39	2950	81	45	82	472
		40-59	2850	78	43	79	456

UDC: 613:577.4 (07)
Hygiene and Ecology. Module 2:
Workbook for students of medical faculty.
V.A. Korobchanskiy, O.I.Gerasimenko
Kharkov: KNMU, 2012. 66 pages

Structure and content of workbook for students corresponds to educational program and basic program plan of practical lessons for students of the 3rd year study. It includes list of compulsory practical skills and practical lessons for special questions of hygiene.

Workbook contains the main information and reference materials in order to international and Ukrainian hygienic standards and other purposeful information.

Approved by scientific council of KNMU
Protocol № 6 from 21.05.2009.

© Kharkov National Medical University, 2012 .

All rights reserved. This book is protected by copyright. No part of it may be reproduced, stored in a retrieval system, or transmitted in any form by any means electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the authors.