Fund of Assessment Tools

for the discipline **"Microbiology and Virology"**

Level of Higher Education:

SPECIALIST DEGREE

Field of Study:

31.05.01 (RF), 560001 (KR) — General Medicine

(code and name of the field of study)

Qualification:

Medical Doctor

2024

1. ПЕРЕЧЕНЬ КОМПЕТЕНЦИЙ С УКАЗАНИЕМ ЭТАПОВ ИХ ФОРМИРОВАНИЯ В ПРОЦЕССЕ ОСВОЕНИЯ ДИСЦИПЛИНЫ

List of Competencies and Formation Stages	Planned learning outcomes for the discipline, characterizing the stages of competence development	Types of assessment tools/section code in this document
PC-1: Capable and ready to implement a set of measures aimed at maintaining and strengthening health and including: the formation of a healthy lifestyle, the prevention of the occurrence and (or) spread of diseases, their early diagnosis, the identification of the causes and conditions of their occurrence and development, as well as those aimed at eliminating the harmful effects of environmental factors on human health	*The student must: Know, i.e., reproduce and explain the educational material with the required degree of scientific accuracy and completeness:* *The main stages in the development of microbiology. The relationship of this science with other disciplines, the objectives and methods of research, and the principles of microbial taxonomy. The structure and shape of the microbial cell and the function of its various components, their chemical composition, physiology, and biochemistry of bacteria, as well as the characteristics of nutrition, respiration, growth, and reproduction. The distribution and role of microbes in the environment. The influence of environmental factors on microorganisms. The morphology, ultrastructure, classification, and nature of viruses. The replication of DNA and RNA viruses, their cultivation, antigens, and the production and use of phages. The nature of prions and the characteristics of prion diseases. The genetics of bacteria and viruses. The role of mutations and recombinations in bacterial evolution. Extrachromosomal factors of heredity. The concept of genetic engineering and its practical applications. Sources and methods of obtaining antibiotics, their classification by structure, spectrum and mechanism of action. Features of genetic control of pathogenicity and antibiotic resistance of microbes, mechanisms of resistance development. Complications during antibiotic therapy, methods for determining the sensitivity of microbes to antibiotics. Features of the formation of symbiosis processes between the human body and microbes, the role of resident microflora in the development of opportunistic diseases. Mechanisms and factors of infectious process development. Pathogenicity and virulence of microbes. The role of opportunistic microflora in human pathology, the development of nosocomial infections. The formation of immunity, its types, mechanisms and factors: immunocompetent cells, their interaction in cellular and humoral immunity. Antigens of microbes and viruses, their properties, types. Mechanisms of interaction between antigens and antibodies. Mechanisms of the development of immediate and delayed allergies, forms of manifestation, and preventive measures. The role of individual representatives of the microbial world in the etiology and pathogenesis of major human infectious diseases. Methods of microbiological diagnostics. How to collect samples (sputum, pus, blood, urine, feces, throat swabs, hand swabs, environmental samples, etc.) for bacteriological, virological, and serological testing in children. Use of essential antibacterial, antiviral, and specific drugs. Vaccines and their types; immune diagnostic and therapeutic agents. Principles of their production and use.*	Blocks A, D - Reproductive-level tasks -test assignments -paper defense -report with presentation -situational problem solving -notebook preparation with notes and drawings

	The student must be able to: Comply with sanitary, hygienic, and anti-epidemic regulations in a bacteriological laboratory. Justify the choice of test material for diagnosing infectious and opportunistic diseases from a microbiological perspective. Observe safety precautions and work rules for handling materials that pose a biological hazard. Prepare microscopic specimens from the test material (pus, sputum, blood, etc.) and a pure microbial culture. Stain smears using simple and complex methods (Gram, Ziehl-Neelsen, Neisser, Gins, Romanovsky-Giemsa, etc.). Set up and operate phase-contrast, fluorescence, and dark-field microscopes. Prepare basic nutrient media for culturing microorganisms. Inoculate test material on liquid and solid nutrient media. Isolate a pure culture of microbes - aerobes and obligate anaerobes. Identify the isolated pure culture of bacteria by morphological, tinctorial, cultural, biochemical, and antigenic properties. Determine the phage sensitivity and phage type of the bacterial culture. Study the sensitivity of bacteria to antibiotics. Work with laboratory animals: fix, infect by various methods, collect blood, perform an autopsy, make smears-imprints of organs, and blood cultures. For the cultivation of obligate intracellular parasites, prepare a cell culture (primary trypsinized single-layer from chicken embryos and transplantable). Infect the cell culture and the chicken embryo. Conduct the indication and identification of viruses in the cell culture and on the chicken embryo. Use the acquired knowledge to determine the tactics of antibacterial, antiviral, and immunotropic therapy; apply the principles of emergency prophylaxis and antitoxic therapy of patients.	Block B, D - tasks at the reconstructive level - solving test tasks - solving situational problems - test - midterm assessment
	The student must possess: *The student can demonstrate the ability to solve complex problems based on acquired knowledge, skills, and abilities, applying them in atypical situations, i.e., possess: Basic methods of sterilization, disinfection, and antiseptic treatment of instruments and equipment to prevent infection of the physician and patient. Skills in making a preliminary diagnosis based on the results of laboratory microbiological examination of adults and adolescents. Methods for interpreting microbiological test results, determining the antimicrobial activity of antibiotics, and microbiologically based rules for their use in treating patients. Basic skills in working with material containing pathogenic and opportunistic microorganisms. Methods for selecting antimicrobial and immunobiological agents for the adequate prevention and treatment of infectious diseases. Basic skills in working with modern devices used to diagnose infectious diseases.*	Blocks C and D - practice-oriented and/or research-based assignments -solving situational problems -solving test assignments -defending abstracts -report with presentation -essay development -group work

2. TECHNOLOGICAL MAP OF THE DISCIPLINE "MICROBIOLOGY AND VIROLOGY"

Course 2 / Semester 3, ZE - 4, Reporting - credit

Name of the discipline modules according to the RPD	Control	Form of control	Minimum credit	Credit maximum	Control schedule
Module 1: Microbial Morphology					
Section 1. Morphology of microbes	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	4	6	1 - 4
	Control Point No. 1	Theoretical assignment, Tests, Situational task	5	10	5
Module 2: Microbial Physiology					
Section 2. Physiology of Microbes	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	3,9	5,1	6 - 8
Section 3. General Virology	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	1,6	2,9	9
Section 4. Genetics of Microorganisms	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	2,5	4	10
	Colloquium No. 1	Theoretical assignment, Tests, Situational task	10	15	11
Module 3: Infectious Process					
Section 5. Infectious Process	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	2	4	12
Module No. 4: Private Medical Bacteriology					
Section 6. Special Medical Bacteriology: Coccal and Airborne Infections	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	4	7	13 - 16
	Colloquium No. 2	Theoretical assignment, Tests, Situational task	7	14	17

TOTAL for the semester			40	70	
		*Attendance: 1 point is deducted for each missed or unattended class or lecture.			
Midterm assessment: Album design, Development of a topic table, Video development, Abstract defense, Report with presentation			20	30	18
Semester ranking by discipline			60	100	

TECHNOLOGICAL MAP OF THE DISCIPLINE "MICROBIOLOGY AND VIROLOGY"

Course 2 / Semester 4, 3rd Unit, Reporting Exam

Name of the discipline modules according to the RPD	Control	Form of control	Minimum credit	Maximum credit	Control schedule
Module No. 4: Private Medical Bacteriology					
Section 6. Special Medical Bacteriology: Intestinal Infections	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	4	9	19 - 20
	Control No. 2	Theoretical assignment, Tests, Situational task	5	10	21
Section 6. Anaerobic zoonotic, spirochetal, and rickettsial infections	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	7	12	22 - 26
	Colloquium No. 3	Theoretical assignment, Tests, Situational task	10	15	27
Module No. 5: Private Medical Virology					
Section 7. Private Medical Virology	Current	Frontal survey, Lesson activity, SRS – note-taking Attendance*	6	8	28 - 34
	Colloquium No. 4	Theoretical assignment, Tests, Situational task	8	16	35

TOTAL for the semester			40	70	
		*Attendance: 1 point is deducted for each missed or unattended class or lecture.			
Midterm Assessment: Conference Presentation, Participation in the "World of Microbes" Olympiad, Exam			20	30	36
Semester ranking by discipline			60	100	

Block A

3. TYPICAL TESTS AND OTHER MATERIALS REQUIRED FOR ASSESSING PLANNED LEARNING OUTCOMES IN THE DISCIPLINE (ASSESSMENT TOOLS)

TESTS

TEST #1 "MORPHOLOGY SECTION"

1. Structures required for L-form bacteria:
1. Cell wall
2. Cytoplasmic membrane
3. Capsule
4. Flagella
5. Nucleoid

2. The significance of volutin granules:
1. Protection from adverse factors
2. Maintaining shape
3. Storing nutrients
4. Participating in reproduction
5. Differentiating feature

3. Peritrichous bacteria are bacteria with:
1. One flagellum
2. Two polar flagella
3. A tuft of flagella at the end
4. Multiple flagella covering the entire surface of the bacterial cell
5. Three flagella

4. Peritrichous bacteria include:
1. Vibrio cholerae
2. Spirilla bacteria
3. Helicobacter
4. Escherichia
5. Salmonella

5. Fixation of the smear results in:
1. Death of microbes
2. Attachment to glass
3. Increased susceptibility to dye
4. Increased peptide glycan in the cell wall
5. Decreased peptide glycan in the bacterial cell wall

6. A nucleoid is:
1. Analogous to the nucleus in bacteria
2. Possesses a membrane-bound nucleolus
3. Bacterial DNA is bound to basic histone proteins
4. Is diffusely arranged in fibrils
5. Consists of double-stranded DNA, closed in a ring

7. A prokaryotic cell has:
1. A morphologically defined nucleus
2. A nucleoid (double-stranded DNA molecule, closed ring)
3. A nuclear membrane
4. Mesosomes
5. Mitochondria

8. Phase-contrast microscopy is used to study the following preparations:
1. Gram-stained
2. Native "crushed" or "hanging drop"
3. Fixed with methyl alcohol
4. Ziehl-Neelsen stain
5. All of the above are true

9. An essential structural component of a bacterial cell:
1. Cytoplasmic membrane
2. Cytoplasm
3. Nucleoid
4. Flagella
5. Capsule

10. Morphological structures that determine positive or negative Gram staining:
1. Cell wall
2. Cytoplasmic membrane
3. Cytoplasm
4. Nucleoid
5. Capsule

11. The cell wall of Gram-positive bacteria contains:
1. Multilayer peptide glycan
2. Single-layer peptide glycan
3. Teichoic acids
4. Lipopolysaccharide
5. RNA

12. Taxonomic categories reflecting the binary nomenclature (name) of microorganisms:
1. Kingdom, subkingdom
2. Division, class
3. Order, species
4. Family, genus
5. Genus and species

13. Function of the cell wall:
1. Protective
2. Form-forming

3. Ability to perceive dyes differently
4. Preservation of hereditary information
5. Selective permeability

14. Bacteria that do not have a cell wall:
1. Rickettsia
2. Spirochetes
3. Mycoplasma
4. Chlamydia
5. Actinomycetes

15. The cytoplasmic membrane consists of:
1. A prominent mucous layer covering the cell wall
2. A phospholipid bilayer interspersed with protein globulins
3. A vital structural component of the bacterial cell
4. A complex colloidal system
5. A complex nucleoprotein

16. Functions of the cytoplasmic membrane:
1. Regulation of the entry of metabolites and ions into the cell
2. Participation in DNA replication
3. Maintenance of hereditary information
4. Participation in metabolism
5. Participation in spore formation

17. Localization of hereditary information in a bacterial cell:
1. Cytoplasmic membrane
2. Mitochondria
3. Mesosomes
4. Nucleoid
5. Plasmids

18. The taxonomy of microorganisms is based on the following properties:
1. Morphological
2. Biochemical
3. Allergic
4. Physiological
5. Molecular genetic

19. Robert Koch developed:
1. A method for isolating pure bacterial cultures
2. Formulated the concept of immunity
3. Proposed aniline dyes and a condenser
4. Okryl Tuberculosis and cholera pathogens
5. Developed serological reactions

20. Acid resistance of bacteria is associated with the presence of:
1. Nucleic acids
2. Sebaceous substances
3. Polysaccharides
4. Multilayered peptide glycan
5. High salt concentrations

21. Spirochete morphology is characterized by:
1. Rod-shaped
2. Differentiated nucleus
3. Elastic axial thread
4. Active movement
5. Sporulation

22. Rickettsiae are characterized by:
1. Non-cellular structure
2. Reproduction by fission
3. Positive Gram staining
4. Polymorphism
5. Intracellular parasitism

23. Capsules are formed only in the body by pathogens of:
1. Cholera
2. Tuberculosis
3. Siberian Ulcers
4. Pneumonia
5. Tularemia

24. Based on the number and arrangement of flagella, microorganisms are classified as:
1. Monotrichous
2. Spheroplasts
3. Lophotrichous
4. Protoplasts
5. Peritrichous

25. Microbial spores are important for:
1. Reproduction
2. Preservation of the species
3. Identification
4. Participation in metabolism
5. Active movement

26. Spores are formed by:
1. Bacteria
2. Bacilli
3. Clostridia
4. Mycoplasma
5. Chlamydia

27. A simple staining method allows us to determine the following in a microbial cell:
1. Spores
2. Capsule
3. Acid fastness
4. Gram staining (plus or minus)
5. Volutin grains

28. The ability to perceive dyes (tinctorial properties) is determined by the structure and composition of:
1. Cytoplasm
2. Nucleoid

3. Capsule
4. Cell wall
5. Plasmids

29. Preparation of a specimen for microscopic examination involves:
1. Air-drying the smear
2. Flame-drying the smear
3. Flame-fixing the smear
4. Fixing the smear Alcohol
5. Staining of smears without fixation

30. Ziehl-Neelsen staining is used to detect:
1. Nuclear substance
2. Inclusions
3. Acid resistance
4. Motility
5. Capsule formation

31. The response of microbes to Gram staining depends on:
1. Cell shape and size
2. Cytoplasmic membrane structure
3. Peptidoglycan content in the cell wall
4. Colony shape
5. High salt concentrations

32. Antonius Leeuwenhoek was the first to:
1. Created the theory of immunity
2. Proposed nutrient media
3. Discovered phagocytosis
4. Designed a microscope
5. Observed and drew microbes

33. Mycoplasmas are characterized by the absence of: 1. Cytoplasmic membrane
2. Cytoplasm
3. Nucleoid
4. Cell wall
5. Ribosomes

34. Bacteria that do not have a cell wall:
1. Rickettsia
2. Spirochetes
3. Chlamydia
4. Mycoplasma
5. Actinomycetes

35. Bacterial cytoplasmic membrane:
1. Plays an important role in metabolism
2. Serves as an osmotic barrier
3. Controls the entry and exit of various substances from the cell
4. Determines cell shape
5. Stores hereditary information

36. Bacterial cytoplasm:

1. Complex colloidal system
2. Contains a differentiated nucleus
3. Consists of soluble proteins
4. Contains 50,000 ribosomes
5. Contains no inclusions glycogen, starch, volutin

37. Bacterial mesosomes:
1. Cell wall derivatives
2. Derivatives of cytoplasmic membranes
3. Not associated with the nucleoid
4. Participate in cell division
5. Participate in spore formation

38. Plasmids:
1. Extrachromosomal factors of heredity
2. Autonomous circular DNA molecule
3. Vital structure of the bacterial cell
4. Causes selective advantages
5. Incapable of replication

39. The role of the capsule in bacterial life:
1. Enhances pathogenicity
2. Is an essential structural component of the cell
3. Inhibits phagocytosis
4. Serves as an osmotic barrier
5. Determines cell shape

40. The bacterial capsule is characterized by:
1. Easy staining
2. High polysaccharide content
3. Acid fastness
4. Antigenic specificity
5. Presence in all bacteria

41. The bacterial capsule is detected by staining using:
1. Burri-Hins
2. Simple method
3. Neisser
4. Ziehl-Neelsen
5. Ozheshki

42. Capsules are formed in the body by pathogens:
1. Tuberculosis
2. Leprosy
3. Anthrax
4. Plague
5. Tularemia

43. Structures required for L-form bacteria:
1. Cell wall
2. Cytoplasm
3. Capsule
4. Cytoplasm

5. Nucleoid

44. Bacterial motility is determined by:
1. Phase-contrast microscopy
2. Burri-Hins method
3. Ultramicroscope
4. In a "crushed droplet"
5. Gram staining

45. Bacterial flagella:
1. Participate in reproduction
2. Serve to preserve the species
3. Determine motility
4. Are antigens
5. Consist of the protein flagellin

46. Pili (fibrin, villi) determine:
1. Motility
2. Transfer of genetic material
3. Adhesion
4. Replication
5. Protein synthesis

47. Native, unstained preparations are prepared for microscopy:
1. Light
2. Darkfield
3. Phase-contrast
4. Fluorescent
5. Electron

48. Preparation of a preparation for microscopic examination involves: 1. Air-drying the smear
2. Flame-drying the smear
3. Flame-fixing the smear
4. Staining bacteria without fixation
5. Alcohol-fixing the smear

49. Neisser staining is used to detect:
1. Spores
2. Flagella
3. Nuclear substance
4. Volutin grains
5. Capsules

50. The following are used for Gram staining:
1. Carbolic fuchsin solution
2. Carbolic gentian violet solution
3. Aqueous fuchsin solution
4. Treatment with sulfuric acid
5. Decolorization with alcohol

51. Structures required for bacteria:
1. Capsule

2. Spores
3. Nucleoid
4. Cytoplasmic membrane
5. Flagella

52. Bacterial nucleus:
1. Diffusely located
2. Has a nuclear membrane
3. Is a chromosome
4. Double-stranded circular DNA
5. Single-stranded RNA

53. Bacteria that do not have a cell wall:
1. Rickettsia
2. Chlamydia
3. Spirochetes
4. Mycoplasmas
5. Actinomycetes

54. A simple staining method allows one to: 1. Identify the cell wall
2. Determine the shape
3. Detect the capsule
4. Identify spores
5. Study the structure of the nucleoid

55. Volutin grains are revealed by staining using the following methods:
1. Gram stain
2. Ziehl-Neelsen stain
3. Loeffler stain
4. Burri-Gins stain
5. Neisser stain

56. Neisser staining uses:
1. Gentian violet solution
2. Alkaline methylene blue solution
3. Acetic acid methylene blue solution
4. Vesuvine solution
5. Alcohol

57. Plasmids:
1. Extrachromosomal factors of heredity
2. Vital structure of the bacterial cell
3. Confer certain selective advantages on bacteria
4. Autonomous circular molecule of double-stranded DNA
5. Incapable of autonomous replication

58. Bacterial mesosomes:
1. Are the equivalent of the nucleus
2. Derivatives of the cytoplasmic membrane
3. Not associated with the nucleoid
4. Participate in cell division
5. Participate in spore formation

59. Acid resistance of microorganisms is associated with The presence of:
1. Nucleic acids
2. Sebaceous substances
3. Polysaccharides
4. High concentrations of salts
5. Multilayered peptide glycan

60. Acid-fast bacteria include the causative agents of:
1. Pneumonia
2. Actinomycosis
3. Tuberculosis
4. Brucellosis
5. Leprosy

61. Louis Pasteur:
1. Constructed the first microscope
2. Proved that each type of fermentation has its own causative agent
3. Discovered the causative agent of puerperal fever, furunculosis, and osteomyelitis
4. Is the founder of chemotherapy
5. Developed a vaccine against rabies and anthrax

62. Mycoplasmas are characterized by:
1. The presence of a cell wall
2. The absence of Cytoplasmic membrane
3. Polymorphism
4. Absolute intracellular parasitism
5. Gram-negative staining

63. Gram staining uses:
1. Carbolic fuchsin solution
2. Carbolic gentian violet solution
3. Aqueous fuchsin solution
4. Alcohol decolorization
5. Aqueous methylene blue solution

64. A prokaryotic cell has: 1. A morphologically defined nucleus
2. A nuclear membrane
3. The Golgi apparatus
4. Mesosomes
5. Mitochondria

65. Microorganisms classified as prokaryotes:
1. Bacteria
2. Protozoa
3. Rickettsia
4. Actinomycetes
5. Mycoplasmas

66. An essential structural component of a bacterial cell:
1. Nucleoid
2. Spore
3. Cytoplasm
4. Capsule

5. Cytoplasm

67. Microbial spores are important for:
1. Reproduction
2. Preservation of the species
3. Identification
4. Participation in metabolism
5. Protein synthesis

68. The role of the capsule in bacterial life:
1. Enhances pathogenicity
2. Is an essential structural component of the cell
3. Prevents phagocytosis
4. Is an osmotic barrier

69. Nucleoid:
1. Analog of the nucleus
2. Circular, double-stranded DNA, located diffusely in the cell cytoplasm
3. Associated with basic histone proteins
4. Compactly located, has a membrane and nucleolus
5. Stores and transmits hereditary information

70. Microorganisms that are unable to independently synthesize any organic compounds they need (carbohydrates, amino acids) are called:
1. Prototrophs
2. Heterotrophs
3. Auxotrophs
4. Autotrophs
5. Chemotrophs

71. The bacteriological method of examination includes:
1. Preparing a smear from the test material and staining it with Gram stain
2. Dispersing the test material to obtain isolated colonies
3. Methods for detecting the capsule, motility, and spores in bacteria
4. Methods for isolating pure cultures of aerobic and anaerobic microorganisms
5. Differentiation and identification of a pure culture of isolated bacteria

72. Phases of bacterial growth on a liquid nutrient medium:
1. Dying off
2. Maximum stationary
3. Lag
4. Negative acceleration
5. Logarithmic growth

73. Pure bacterial culture is used:
1. For the diagnosis of infectious diseases
2. In the production of vaccines
3. For the preparation of diagnostic drugs
4. In the production of antibiotics
5. In none of the above

74. Bacterial enzymes are characterized by:
1. Protein nature

2. High molecular weight structure
3. Non-specific action
4. A vital role in metabolism
5. Specificity of action

COLLOQUIUM No. 1 ON THE SECTION "PHYSIOLOGY AND GENETICS OF MICROBES"

1. Phases of bacterial growth in a liquid nutrient medium:
1. Dying off
2. Maximum steady-state
3. Lag
4. Negative acceleration
5. Logarithmic growth

2. Plasmids are capable of:
1. Synthesizing the cytoplasmic membrane of a bacterial cell
2. Integrating into the chromosome and replicating along with it
3. Autonomously replicating and existing in the cell cytoplasm
4. Providing bacteria with temporary advantages
5. Determining the plastic and energy metabolism of the cell

3. Microbial enzymes:
1. Promoting the manifestation of bacterial pathogenicity
2. Allowing the identification of bacterial species and variants
3. Breaking down proteins, fats, and carbohydrates into simpler compounds
4. Carrying out the oxidation-reduction process in the cell
5. Transferring hereditary information

4. A pure microbial culture is:
1. Growth on a nutrient medium environment of a single microbial species
2. Microorganisms of the same species isolated from different sources
3. Microorganisms of the same species isolated at different times of the year
4. Bacterial cultures obtained by subculture of isolated colonies
5. Bacterial cultures obtained by subculture of different colonies

5. Enzyme composition of any microorganism:
1. Determined by the genome
2. Responsible for heredity
3. Is a stable trait
4. Used to differentiate bacteria
5. Promotes the manifestation of pathogenic properties

6. Differential diagnostic media include:
1. Lowenstein-Jensen
2. Endo
3. Russell
4. Hiss
5. Kitt-Tarozzi

7. Nutrients penetrate the bacterial cell as a result of:
1. Simple diffusion

2. Facilitated diffusion
3. Oxidation processes
4. Active transport
5. Group Translocations

8. Pure bacterial cultures are used:
1. For the diagnosis of infectious diseases
2. In vaccine production
3. For the preparation of diagnostic preparations
4. In the production of antibiotics
5. In the production of sulfonamide drugs

9. The physiological and biochemical characteristics of microorganisms are of great importance for:
1. Bacterial taxonomy
2. Differentiation and identification
3. Solving environmental problems
4. Studying the mechanisms of pathogenic action
5. Vaccine and antibiotic production

10. Genetic recombinations include:
1. Conjugation
2. Modification
3. Transformation
4. Dissociation
5. Transduction

11. The emergence of antibiotic-resistant strains of microorganisms is facilitated by the use of antibiotics:
1. Without determining their susceptibility
2. Without sufficient indications
3. The same ones for the treatment of humans, animals, and birds
4. In high doses and in combination with chemotherapy
5. As food preservatives

12. The genetic information in a bacterial cell is localized in:
1. The cytoplasmic membrane
2. Metochondria
3. Mesosomes
4. The nucleoid
5. Plasmids

13. Mutations are characterized by:
1. Phenotypic changes in one or more microorganism traits
2. Hereditarily fixed loss or change in a microorganism trait
3. No change in the primary DNA structure
4. Partial loss of nucleotides in DNA
5. Changes in the nucleotide sequence in DNA

14. Transduction consists of the following steps:
1. Integration of bacterial DNA fragments into the phage genome
2. Transfer of DNA fragments through the conjugative bridge
3. Cleavage of the bacterial chromosome by the phage

4. Invasion of the phage into a new bacterial cell
5. Redistribution of genetic material with the formation of a recombinant

15. Microorganisms with the most pronounced antagonistic properties:
1. Mycobacteria
2. Actinomycetes
3. Fungi
4. Mycoplasmas
5. Bacteria

16. Transformation is:
1. Transfer of genetic material from one bacteria to another using phages
2. Transfer of DNA from cell to cell upon contact
3. Changes in the structure of the recipient DNA due to the incorporation of fragments of donor DNA
4. Adaptive response of microbial cells in response to changes in environmental conditions
5. Direct transfer of a fragment of donor DNA to the recipient cell

17. Transformation is accomplished using:
1. Temperate phage
2. Fertility factor
3. Plasmid
4. Donor culture DNA
5. Transposon

18. Bacteriological examination method includes:
1. Preparation of a smear from the material to be examined and Gram staining
2. Dispersion of the material to be examined to obtain isolated colonies
3. Detection of the capsule, motility, and spores in bacteria
4. Isolation of pure Cultures of aerobic and anaerobic microorganisms
5. Differentiation and identification of pure cultures of isolated bacteria

19. Genetic engineering:
1. Used to produce new drugs that do not exist in nature
2. Replaces methods for producing therapeutic and diagnostic serums
3. Not of decisive importance in the development of biotechnology
4. Allows the production of live vaccines carrying antigens of several microorganisms
5. Plays an important role in the ecology of pathogenic bacteria

20. Medicines obtained by genetic engineering
1. Leukocyte interferon
2. Human insulin
3. Growth hormone
4. Monoclonal antibodies
5. Diagnostic agents

21. Extrachromosomal factors of heredity include:
1. Ribosomes
2. Transposons
3. Mesosomes
4. Plasmids
5. Is sequences

22. Plasmids:
1. Genetic elements vital to bacterial cells
2. Genetic elements conferring certain selective advantages on bacteria
3. Closed rings of double-stranded DNA
4. Single-stranded linear RNA
5. Extrachromosomal genetic structures of bacteria

23. Bacteria are identified by digestion of:
1. Carbohydrates
2. Lipids
3. Salts
4. Gelatin
5. Peptone

24. Colony characteristics important for bacterial identification:
1. Size
2. Shape
3. Edge
4. Color
5. Temperature

25. The role of pigments in microbial life:
1. Protect from ultraviolet rays
2. Increase the enzymatic activity of bacteria
3. Participate in respiration
4. Have antibiotic activity
5. Not considered when identifying bacteria

26. Pure bacterial cultures are used:
1. For the diagnosis of infectious diseases
2. In vaccine production
3. For the preparation of diagnostic preparations
4. In the production of antibiotics
5. In none of the above

27. A pure microbial culture is:
1. The progeny of a single microbial cell grown on a nutrient medium
2. Microorganisms of the same species isolated from different sources
3. Microorganisms of the same species isolated at different times of the year
4. Bacterial cultures obtained by subculture of isolated colonies
5. Bacterial cultures obtained by subculture of different colonies

28. Bacterial differentiation on Endo medium is based on:
1. Lactose breakdown
2. Peptone breakdown
3. Acid formation
4. Reduction of basic fuchsin
5. Glucose breakdown

29. Plasmids:
1. Genetic elements vital to bacterial cells
2. Genetic elements that confer certain selective advantages on bacteria
3. Closed rings of double-stranded DNA

4. Single-stranded linear RNA
5. Extrachromosomal genetic structures of bacteria

30. Main properties of plasmids:
1. An essential component of the bacterial cell
2. Produce biologically active substances
3. Carry specific genetic information
4. Can integrate into the bacterial cell genome
5. Are pathogenicity factors

31. Is sequences:
1. Specific migrating DNA fragments
2. Genes required for integration with non-homologous regions of replicons
3. Genes capable of independent replication and autonomous existence
4. Contain information necessary only for movement to different DNA sites
5. Encode the interaction of transposons, plasmids, and temperate phages with each other and with the bacterial cell chromosome

32. Transposons:
1. Complex genetic structures capable of independent replication
2. Isolated DNA fragments incapable of replication
3. Perform regulatory and coding functions
4. Capable of moving from one replicon (chromosomal DNA) to another (plasmid) and vice versa
5. Not involved in the formation of antibiotic resistance in bacteria

33. Plasmids:
1. Genetic elements vital to the bacterial cell
2. Genetic elements that confer certain selective advantages on bacteria
3. Closed circles of double-stranded DNA
4. Single-stranded linear RNA
5. Extrachromosomal genetic structures of bacteria

35. Principles of rational antibiotic therapy:
1. Prescribe strictly according to indications, after determining the sensitivity of the pathogen to antibiotics
2. Correct dosage and the possibility of combining different drugs
3. Prescribe treatment in minimal doses, allowing microorganisms to adapt
4. Consider the antibiotic resistance of bacteria in the patient's environment (hospital department, geographic region)
5. Discontinue antibiotic administration immediately after the temperature drops and Improvement of the patient's condition (ignore the duration of antibiotic therapy)

36. Obligate anaerobes:
1. Grow and reproduce both in the presence and absence of oxygen
2. Require free oxygen
3. Obtain energy through fermentation
4. No pathogenic representatives
5. Use anoxic respiration

37. Antibiotics:
1. Highly active metabolic products of microorganisms
2. Selectively inhibit the growth of various bacteria and some tumors

3. They do not differ from each other in their mechanism of action
4. They have a bacteriostatic or bactericidal effect on microorganisms
5. The antimicrobial spectrum of action is the same for all

38. Antibiotics are classified by:
1. Origin
2. Chemical composition
3. Mechanism of inhibitory action
4. Solubility in alcohol
5. Method of production

39. Laboratory glassware is sterilized by:
1. Tyndallization
2. Flowing steam
3. Autoclaving
4. Pasteurization
5. Dry heat

40. Ionizing radiation and ultrasound are used to sterilize:
1. Rooms
2. Food products
3. Nutrient media
4. Vaccines and serums
5. Laboratory glassware

41. Microbial antagonism is caused by:
1. Different growth rates of microorganisms requiring the same nutrients
2. The formation of acids, alcohols, and other metabolic products by microorganisms that alter the conditions for the existence of other microorganisms in the environment
3. The release of growth substances (amino acids, vitamins, etc.) by microorganisms that stimulate the growth of other microorganisms
4. The release of antibiotic substances and bacteriocins into the environment
5. Nutrition of one microorganism at the expense of another

42. Virogeny:
1. An obligatory stage of viral reproduction
2. Integration of viral nucleic acid into the cell chromosome
3. Characteristic only of DNA viruses
4. Mechanism of viral persistence
5. Cause of tumors and autoimmune diseases

43. Characteristic properties of viruses:
1. Cellular structure
2. One type of nucleic acid
3. Disjunctive mode of reproduction
4. Absolute intracellular parasitism
5. Possibility of integration into the cellular genome

44. Bacteriophage reproduction occurs:
1. In chicken embryos
2. In artificial nutrient media
3. In the cells of a certain species of bacteria
4. In the body of animals

5. In the cells of any bacterial cultures

45. Bacteriophages are characterized by:
1. Cellular structure
2. Content of nucleic acids - DNA and RNA
3. Content of one nucleic acid - DNA or RNA
4. Intracellular parasitism
5. Widespread occurrence in nature

46. Elective media include:
1. Blood agar
2. Alkaline agar
3. Yolk-salt agar
4. Bile broth
5. Clotted serum

47. A pure microbial culture is:
1. Growth of bacteria of one species on a nutrient medium
2. Microorganisms of the same species isolated from different sources
3. Microorganisms of the same species isolated at different times of the year
4. Bacterial cultures obtained by subculture of isolated colonies
5. Bacterial cultures obtained by subculture of different colonies

48. Pure bacterial culture Used:
1. For the diagnosis of infectious diseases
2. In the production of vaccines
3. For the preparation of diagnostic preparations
4. In the production of antibiotics
5. In the production of sulfonamide drugs

49. The following media are considered differential diagnostic:
1. Lowenstein-Jensen
2. Endo
3. Russell
4. Hiss
5. Kitt-Tarozzi

50. Sterilization is:
1. Destruction of microorganisms pathogenic to humans
2. Disinfection of environmental objects
3. Sterilization of material
4. Complete destruction of microorganisms in various materials
5. Prevention of the penetration of microbes into human tissues

51. Phages are used for:
1. Typing bacteria
2. Diagnostics
3. Prevention
4. Therapy
5. Indication of bacteria

52. The bacteriological method of research includes:
1. Preparing a smear from the sample material and staining it with Gram stain

2. Dispersing the sample material to obtain isolated colonies
3. Methods for detecting the capsule, motility, and spores in bacteria
4. Methods for isolating pure cultures of aerobic and anaerobic microorganisms
5. Differentiation and identification of pure cultures of isolated bacteria

53. Antibiotics:
1. Highly active metabolic products of microorganisms
2. Selectively inhibit the growth of various bacteria and some tumors
3. Promote the manifestation of pathogenic properties of bacteria
4. Classified by chemical composition, mechanism, and spectrum of action
5. Hydrolyze macromolecules of proteins, fats, and carbohydrates

54. Extrachromosomal factors of heredity include:
1. Ribosomes
2. Transposons
3. Mesosomes
4. Plasmids
5. Is sequences

55. Plasmids:
1. Genetic elements vital to bacterial cells
2. Genetic elements conferring certain selective advantages on bacteria
3. Closed rings of double-stranded DNA
4. Single-stranded linear RNA
5. Extrachromosomal genetic structures of bacteria

56. The mechanism of action of antibiotics is determined by:
1. Disruption of the function of the cytoplasmic membrane
2. Changes in the antigenic structure of bacteria
3. Inhibition of bacterial cell wall synthesis
4. Blocking protein synthesis on ribosomes
5. Enhancement of the biochemical activity of bacteria

57. Mechanisms of the development of microbial resistance to antibiotics:
1. Synthesis of enzymes that destroy antibiotics (β-lactamases, penicillinases).
2. Loss of cell wall permeability
3. Impaired antibiotic transport into the bacterial cell
4. Changes in the structure of the cell wall, cytoplasmic membrane, ribosomes, and nucleoid due to modifications, mutations, and recombinations
5. Transfer of resistance genes (R-genes) to bacteria via plasmids and transposons

58. Factors contributing to the development of antibiotic resistance in bacteria:
1. Uncontrolled use of antibiotics without sufficient indications
2. Use of antibiotics for the prevention of infectious diseases
3. Use of food products containing antibiotics
4. Preliminary determination of the susceptibility of isolated bacteria to antibiotics before prescribing to a patient
5. Use of expired antibiotics

59. Transduction consists of the following stages:
1. Integration of bacterial DNA fragments into the phage genome
2. Transfer of DNA fragments through the conjugative bridge
3. Cleavage of the bacterial Chromosomes under the influence of the phage

4. Phage invasion of a new bacterial cell
5. Redistribution of genetic material with the formation of a recombinant

60. The following are used in a transduction experiment:
1. Virulent phage
2. Temperate phage
3. DNA solution
4. Selective medium
5. Recipient culture

61. Glass laboratory glassware is sterilized by:
1. Tyndallization
2. Flowing steam
3. Autoclaving
4. Pasteurization
5. Dry heat

62. Genetic recombinations include:
1. Conjugation
2. Modification
3. Transformation
4. Dissociation
5. Transduction

63. A change in the nucleotide sequence in DNA is called:
1. Recombination
2. Mutation
3. Transformation
4. Conjugation
5. Transcription

64. Ways to overcome drug resistance in microorganisms:
1. Chemical modification of known antibiotics
2. Development of new chemotherapeutic agents
3. Search for inhibitors that suppress bacterial enzymes
4. Development of drugs that prevent bacterial adhesion to cells
5. Unindicated use of antibiotics

65. The emergence of antibiotic-resistant strains of microorganisms is facilitated by the use of antibiotics:
1. Without determining their susceptibility
2. Without sufficient indications
3. The same ones for the treatment of humans, animals, and birds
4. In high doses and in combination with chemotherapy
5. As food preservatives

66. The following media are considered differential diagnostic:
1. Lowenstein-Jensen
2. Endo
3. Russell
4. Hiss
5. Kitt-Tarozzi

COLLOQUIUM No. 2 "INFECTIOUS PROCESS. COCCAL AND AIRBORNE INFECTIONS"

1. Microbiological methods for diagnosing bacterial infections include:
1. Bacterioscopic, bacteriological
2. Virusoscopic, virological
3. Serological, allergic
4. Morphological, toxicological
5. Biological or experimental

2. For serological diagnosis of tuberculosis, the following must be performed:
1. Ziehl-Neelsen staining of a smear
2. Sputum culture on Lowenstein-Jensen medium
3. Intradermal tuberculin test
4. Determination of antibodies in the patient's serum
5. Accelerated Price method

3. Gram-positive cocci are:
1. Pneumococci
2. Meningococci
3. Streptococci
4. Gonococci
5. Chlamydia

4. The occurrence of infection depends on:
1. Reactivity of the microorganism
2. Climate conditions
3. Environment
4. Virulence of the microorganism
5. Anthropometric data of the microorganism

5. Antibodies, functions:
1. Glue (agglutinate) cells
2. Dissolve (lyse) cells
3. Precipitate (precipitate antigens)
4. Neutralize toxins
5. Cause the development of DTH

6. Pathogen transmission routes:
1. Parenteral
2. Lymphogenous
3. Transmissible
4. Hematogenous
5. Neurogenic

7. Immunoglobulins, which are highly cytophilic for mast cells and cause the development of anaphylactic shock:
1. IgM

2. IgE
3. IgA
4. IgD
5. IgG

8. Introduction Serums by the method. Often used for:
1. Creating active immunity
2. Passive immunity
3. Preventing anaphylactic shock
4. Identifying the pathogen
5. Preventing delayed-type hypersensitivity

9. A thick, grayish-white film, tightly adherent to the underlying tissue, capable of spreading to the lower respiratory tract and causing asphyxia, is characteristic of:
1. Tuberculosis
2. Actinomycosis
3. Whooping cough
4. Diphtheria
5. Dysentery

10. Allergic diagnosis of tuberculosis involves detecting:
1. Antibodies in the patient's serum
2. R-type colonies on the Lowenstein-Jensen medium
3. Cord factor in a smear from the muzzle
4. Delayed-type hypersensitivity to tuberculin
5. Tinctorial properties The causative agent of tuberculosis

11. The virulence of pathogenic microorganisms is associated with:
1. Capsule formation
2. Spore formation
3. Invasiveness
4. Aggressiveness
5. Toxin production

12. The test material for serodiagnosis of an infectious disease is:
1. Isolated pure culture
2. Sputum
3. Pus
4. Patient serum
5. Cerebrospinal fluid

13. Diphtheria bacilli biovar gravis form colonies on Clauberg's medium: 1. Colorless
2. Grayish-black
3. With radial striations
4. Resembling a "lace handkerchief"
5. Resembling a "daisy flower"

14. Genetic determinant of the toxigenicity of diphtheria bacilli is caused by:
1. Capsule

2. Plasmid
3. Prophage
4. Spore
5. Fimbriae

15. The ability to suppress the body's defenses is called:
1. Invasiveness
2. Aggressiveness
3. Adhesion
4. Colonization
5. Toxigenicity

16. In the spleen and lymph nodes:
1. T- and B-lymphocytes differentiate and mature from stem cells.
2. T- and B-lymphocytes settle in the corresponding zones.
3. Hematopoietic stem cells are contained.
4. Plasma cells are concentrated.
5. Antigen-dependent proliferation, differentiation, and cooperation of lymphocytes occur.

17. Specific immune factors are:
1. Neutrophils
2. Interferon
3. Lymphocytes
4. Complement
5. Immunoglobulins

18. Natural active immunity is formed in the body after:
1. Serum administration
2. Disease recovery
3. Toxoid administration
4. Immunoglobulin administration
5. Antibiotic therapy

19. The following are of diagnostic value in rheumatism:
1. Biochemical activity of streptococci
2. Presence of streptococcal antigens in the patient's serum
3. Bioassay on white mice
4. High titers of antibodies to hyaluronidase
5. Increasing titers of antibodies to O-streptolysin

20. Streptococcus pyogenes is characterized by:
1. Exotoxin formation
2. Pronounced biochemical activity
3. Benthic and parietal growth in sugar broth
4. Penicillin resistance
5. Small colonies on blood agar with a clear zone of hemolysis

21. Allergic diagnosis of tuberculosis involves detection of:
1. Antibodies in the patient's blood serum
2. Acid-fast tuberculosis pathogens according to Ziehl-Neelsen
3. Characteristic colonies On Löwenstein-Jensen medium
4. Tuberculin hypersensitivity

5. Cord factor in sputum microscopy

22. Opportunistic mycobacteria differ from Mycobacterium tuberculosis:
1. Lack of pathogenicity for guinea pigs
2. Inability to form "flags" and "braids" in microcultures
3. Positive niacin test
4. Morphological and tinctorial properties
5. Ability to cause tuberculosis-like diseases, primarily in immunocompromised individuals

23. Cultural properties characteristic of Mycobacterium leprae:
1. Not cultured on nutrient media
2. Fastidious about nutrient media
3. Multiply in the paw pads of white mice
4. Multiply in the body of armadillos
5. Grow in cell culture

24. Leprosy is characterized by:
1. Transmitted by human contact with infected animals.
2. Clinical manifestations are caused by cellular immune responses.
3. Diagnosed by isolating the pathogen and determining its biochemical properties.
4. Short incubation period.
5. Diagnosed by detecting the pathogen in smears from scrapings of affected areas.

25. Invasiveness is the ability to:
1. Suppress the body's defenses.
2. Attach to the surface of cells and colonize them.
3. Penetrate underlying tissues.
4. Cause infectious disease.
5. Develop an immune response.

26. The causative agents of urethritis, clinically indistinguishable from gonorrhea, are:
1. Treponema pallidum
2. Chlamydia trachomatis
3. Treponema carateum
4. Mycoplasma hominis
5. Ureaplasma urealytica

27. Chlamydia-induced urethritis is characterized by:
1. Airborne transmission
2. Classified as a sexually transmitted disease
3. Causes miscarriages and infertility
4. Second only to gonorrhea in frequency
5. Does not provide immunity; reinfection and superinfection are possible

28. Laboratory diagnostics for urethral chlamydia include:
1. Microscopy of Romanovsky-Giemsa-stained smears
2. Skin allergy testing
3. Immunofluorescence assay with monoclonal antibodies
4. Cell culture infection
5. Serodiagnosis using ELISA and complete skin test

29. Primary pulmonary tuberculosis is characterized by the formation of:
1. Inflammatory lesions (granulomas-tubercles) in the zone of pathogen penetration

2. Caseous necrosis surrounded by epithelioid cells
3. Delayed-type hypersensitivity
4. Dense infiltrates with fistula formation, the pus of which contains drusen
5. Ghon foci (a healed inflammatory lesion, encapsulated and calcified with viable mycobacteria inside)

30. Disseminated tuberculosis:
1. Related to primary tuberculosis
2. Develops under unfavorable living conditions
3. Characterized by a more widespread inflammatory lesion in the lungs and lymph nodes
4. Characterized by lymphohematogenous spread of mycobacteria to other tissues and organs with the formation of granulomas
5. The possibility of clinical recovery with sufficient immune system tension and timely chemotherapy

31. Depending on the source, infections are classified as:
1. Exogenous
2. Endogenous
3. Anthroponotic
4. Zoonotic
5. Anthropozoonotic

32. The reliability of a bacteriological study depends on the sample collected:
1. In a limited quantity
2. Before the start of antimicrobial therapy
3. Repeatedly during antimicrobial therapy
4. Taking into account the period of the infectious process
5. For immediate inoculation onto appropriate nutrient media

33. Select the set of ingredients required for the agglutination reaction to determine the meningococcal species:
1. Blood serum from a patient with meningitis
2. Pure meningococcal culture
3. Saline solution
4. Meningococcal diagnosticum
5. Species-specific antimeningococcal serums

34. Basic A test to distinguish Mycobacterium tuberculosis from opportunistic mycobacteria:
1. Ziehl-Neelsen staining
2. Mycolic acid hydrolysis
3. High content of fatty-waxy substances
4. Formation of nicotinic acid
5. Gram staining

35. Leprosy:
1. Slightly contagious disease
2. Found worldwide
3. Causes loss of sensation and trophic disorders
4. Characterized by skin wounds, contractures, and self-amputation of fingers
5. Characterized by the fusion of nodular lesions, giving the face a "Facies leonica" appearance

36. Factors determining the virulence of Bordetella pertussis:
1. Pertussis toxin
2. Pili, microvilli
3. Flagella
4. Histamine-sensitizing factor
5. Endotoxin

37. Secondary pulmonary tuberculosis:
1. Occurs at various times after primary tuberculosis
2. Considered an endogenous infection
3. Caused by the reactivation of old foci against the background of weakened immunity
4. Necrotic masses containing numerous mycobacteria are released from the resulting cavities into the environment during coughing
5. Mostly affects young children and adolescents

38. Allergic Mantoux test:
1. Performed subcutaneously
2. The main method of tuberculin diagnostics during mass screenings
3. Used to select a contingent for revaccination
4. Causes antigen mimicry
5. Detects the initial and localized forms of tuberculosis in children and adolescents

39. The aggregation of microbes with the corresponding immune serum is called a reaction:
1. Precipitation
2. Hemolysis
3. Bacteriolysis
4. Flocculation
5. Agglutination

40. The BCG vaccine is a live, attenuated culture of Mycobacterium:
1. tuberculosis
2. africanum
3. scrofulaceum
4. bovis
5. avium

41. The main test for distinguishing Mycobacterium tuberculosis from opportunistic mycobacteria:
1. Ziehl-Neelsen staining
2. Multilayered peptide glycan
3. High content of fatty-waxy substances
4. Formation of nicotinic acid
5. Gram staining

42. Microbiological diagnosis of leprosy consists of:
1. Isolation of a pure culture of the pathogen on Lowenstein-Jensen medium
2. Identification by biochemical properties
3. Research Ziehl-Neelsen stained scrapings from affected areas of skin and mucous membranes.
4. Detection of any acid-fast bacteria, for differentiation using a biological test on guinea pigs (susceptible to M. tuberculosis, resistant to M. leprae).
5. Performing an intradermal skin test with the M. leprae allergen.

43. To differentiate diphtheria corynebacteria from diphtheroids, the following are used:
1. Motility
2. Capsule formation
3. Arrangement of volutinous granules
4. Toxigenicity
5. Nature of hemolysis on blood agar

44. Necessary ingredients for determining antibodies in a patient's blood serum:
1. Known diagnostic, agglutinating immune serum
2. Patient's blood serum
3. Saline solution
4. Diagnosticum (known suspension of myrobes)
5. Pure culture isolated from the test material

45. Killer T-cell cytotoxicity is achieved by synthesizing:
1. Immunoglobulins
2. Perforins
3. Granzymes
4. Granulosins
5. Lysozyme

46. Functions of the bone marrow as a central Immune system organ:
1. Differentiation and maturation of T-lymphocyte subpopulations
2. Antigen-dependent proliferation of T- and B-lymphocytes
3. Differentiation and maturation of B-lymphocytes
4. Production of immunoglobulins
5. Cytotoxic action of T-killers

47. Complement-dependent reactions include:
1. Agglutination
2. Hemolysis
3. Bacteriolysis
4. Precipitation
5. Complement fixation

48. Structure of immunoglobulin G (IgG):
1. Two light polypeptide chains
2. Two heavy polypeptide chains
3. Three Fab fragments
4. Two Fc fragments
5. Two variable regions

49. Characteristic features of Neisseria meningitidis:
1. Diplococci Bean-shaped
2. Large rods with truncated ends
3. Arranged in a chain
4. Arranged intracellularly (incomplete phagocytosis)
5. Gram-negative

50. The cytotoxicity of killer T cells is aimed at the destruction of:
1. Bacteria

2. Viruses
3. Cancer cells
4. Virus-infected cells
5. Transplanted organs

51. To determine the contamination of raw materials (fur, wool) with the anthrax pathogen using a precipitation reaction, you must have:
1. Serum of a patient with anthrax
2. Diagnostic immune anti-anthrax serum
3. Diagnosticum from Bacillus subtilis anthracis
4. Antigens isolated from the test material (fur, wool)
5. Complement diluted 1:10

52. Distinguishing features of parapertussis bacteria:
1. Can grow on MPA
2. Large, brown colonies
3. Grow within 24 hours
4. Small, convex colonies, resembling mercury droplets
5. Colony growth 72 hours after inoculation

53. For specific prophylaxis of meningococcal and pneumococcal infections, the following vaccines are used:
1. Live
2. Killed
3. Chemical
4. Genetically engineered
5. Artificial

54. Chemical vaccine contains:
1. Microorganisms inactivated by heat
2. Non-pathogenic bacteria, into whose genome genes responsible for synthesizing antigens of pathogenic bacteria have been introduced
3. Live bacteria weakened by prolonged passage in an artificial nutrient medium
4. Antigens released from bacteria by chemical action
5. Synthesized antigens

55. Microbiological diagnosis of actinomycosis is based on:
1. Detection of drusen in pus smears
2. Infection of guinea pigs
3. Cultivation of pus on special media
4. Detection of antibodies in a complete blood count (CFC)
5. Skin allergy testing

56. Select the ingredients required for a complete blood count (CFC) test for serological diagnosis of chronic gonorrhea:
1. Patient serum
2. Hemolytic serum
3. Gonococcal antigen
4. Ram red blood cells
5. Complement

57. Exotoxins:
1. Lipopolysaccharide in nature, bound to the microbial cell body

2. Lipopolysaccharide in nature, secreted into the environment
3. Protein in nature, secreted into the environment
4. Highly toxic, selectively affecting organs and tissues
5. Heat-labile, converted into anatoxin when exposed to heat and formalin

58. Pemphigus neonatorum can be caused by strains of Staphylococcus aureus that produce:
1. Plasmacoagulase
2. Lecithinase
3. Hemotoxins
4. Enterotoxins
5. Exfoliatins

59. The main features that allow differentiation of Staphylococcus aureus from Staphylococcus epidermidis:
1. Cell shape, arrangement, Gram stain
2. Presence of hemolysin, lecithinase, plasmacoagulase
3. Motility and sporulation
4. Fermentation of glucose and mannitol under anaerobic conditions to acid
5. Sensitivity to antibiotics

60. In epidemic cerebrospinal meningitis, cerebrospinal fluid is collected:
1. After the administration of antibiotics
2. In compliance with all aseptic rules
3. By puncture between 3-4 lumbar vertebrae
4. Under conditions of possible cooling
5. In centrifuge tubes

61. Invasiveness is the ability of a microorganism to:
1. Suppress the body's defenses
2. Cause infectious disease
3. Acquire human antigens
4. Penetrate underlying tissues
5. Activate cellular adenylate cyclase

62. The bacterial enzymes hyaluronidase, collagenase, fibrinolysin, lecithinase, and neuraminidase determine:
1. Aggressiveness
2. Adhesion
3. Colonization
4. Toxigenicity
5. Invasiveness

63. A thick grayish-white film, tightly adherent to the underlying tissue, capable of spreading to the lower respiratory tract and causing asphyxia, is characteristic of:
1. Tuberculosis
2. Actinomycosis
3. Leprosy
4. Whooping cough
5. Diphtheria

64. For the bacterioscopic diagnosis of diphtheria, the following must be performed:
1. Throat culture on serum-tellurite agar

2. Intradermal test with diphtheria toxin
3. Staining the smear using Neisser or Loeffler methods
4. Infection of susceptible laboratory animals
5. Neutralization of the toxin with antitoxic serum

65. Select the ingredients required for the precipitation reaction to determine the toxigenicity of diphtheria bacilli:
1. Pure cultures of corynebacteria isolated from several patients
2. Blood sera from diphtheria patients
3. Filter paper strips soaked in antitoxic antidiphtheria serum
4. Petri dish with nutrient medium
5. Saline solution

66. Based on the severity of clinical symptoms, infections are classified as:
1. Overt
2. Latent
3. Asymptomatic
4. Typical
5. Atypical

67. Delayed hypersensitivity to tuberculin develops in:
1. Those vaccinated with DPT
2. Those with tuberculosis
3. Those with diphtheria
4. Those vaccinated with BCG
5. Those infected with mycobacteria

68. Immunity in tuberculosis:
1. Antitoxic
2. Non-sterile
3. Cellular
4. Humoral
5. Immune complex

69. Anti-tuberculosis vaccine:
1. Consists of live, weakened Mycobacterium tuberculosis
2. Created by Elbert and Gaisky
3. Consists of killed Mycobacterium bovis
4. Created by Calmette and Guerin
5. Consists of live, weakened Mycobacterium bovis

70. The humoral immune response involves:
1. Macrophages
2. Killer T cells
3. Helper T cells
4. B lymphocytes
5. Plasma cells

CHECKOUT #2 FOR THE SECTION "INTESTINAL INFECTIONS"

1. Source of infection in dysentery:
1. Sick individuals
2. Healthy carriers
3. Rodents
4. Convalescents
5. Small ruminants

2. Bacterial dysentery is caused by:
1. Shigella flexneri
2. Shigella sonnei
3. Entamoeba histolytica
4. Entamoeba coli
5. Shigella boydii

3. Characteristics of stool in dysentery:
1. Rice broth
2. Presence of mucus and blood
3. Rectal spit
4. Diarrhea
5. Fishy odor

4. Shigella differ from Salmonella by:
1. Morphology
2. Motility
3. Antigens
4. Enzymatic activity
5. Cultural properties

5. Drugs for specific prophylaxis of typhoid fever:
1. Chemical vaccine
2. Alcohol vaccine enriched with Vi antigen
3. Live vaccine
4. Anatoxin
5. Immunoglobulin

6. Orphological features characteristic of E. coli:
1. Presence of flagella
2. Capsule formation
3. Spore formation
4. Rounded ends
5. Chain arrangement

7. Diseases caused by opportunistic Escherichia coli:
1. Sepsis
2. Cholecystitis
3. Pyelitis
4. Peritonitis
5. Coli-enteritis

8. Typhoid-paratyphoid diseases are characterized by:
1. Fecal-oral mechanism of infection

2. Seasonality of the disease
3. Chronic course
4. Sources of infection - patients and carriers
5. Zoonotic infections

9. Differential Signs of Salmonella typhi, paratyphoid A, and B:
1. Morphological
2. Tinctorial
3. Antigenic
4. Biochemical
5. Cultural

10. Dysentery is characterized by:
1. Large intestine involvement
2. Tenesmus
3. Presence of mucus and blood in feces
4. Fecal-oral transmission
5. Small intestinal involvement

11. Cholera vibrios form colonies on alkaline agar:
1. Smooth
2. Transparent
3. With smooth edges
4. With a bluish tint
5. With a rough surface

12. Selection of colonies of pathogenic Escherichia coli from Endo medium is based on:
1. Agglutination reaction
2. Colony character
3. Oxidase tests
4. Smear microscopy
5. Motility determination

13. Differentiation criteria for E. coli and Salmonella:
1. Morphological
2. Tinctorial
3. Biochemical
4. Antigenic
5. Cultural

14. Early diagnosis of typhoid fever, paratyphoid A, and B is based on:
1. Animal infection
2. Stool culture
3. Serological method
4. Blood culture
5. Skin allergy test

15. Nutrient media used in the diagnosis of dysentery:
1. Ploskirev
2. Russell
3. Selenite broth
4. Levin
5. Bismuth sulfite agar

16. The causative agents of typhoid fever and paratyphoid fever belong to the genus:
1. Shigella
2. Salmonella
3. Escherichia
4. Klebsiella
5. Yersinia

17. The period of typhoid-paratyphoid infection—parenchymatous diffusion—corresponds to:
1. Onset of illness
2. Peak illness
3. Recovery period
4. Excretory-allergic phase
5. Bacteremia phase

18. Elective media for the isolation of Vibrio cholerae include:
1. Blood agar
2. Alkaline agar
3. Alkaline peptone water
4. Sugar broth
5. Serum agar

19. Ogawa, Inabo, and Hikoshima serovars include:
1. Vibrio cholerae classica
2. Vibrio cholerae El-tor
3. Vibrio cholerae O139 Bengal
4. Yersinia enterocolitica
5. Campylobacter fetus

20. Test material for typhoid fever:
1. Blood
2. Stool
3. Sputum
4. Urine
5. Cerebrospinal fluid

21. Which components of Endo medium affect the color of colonies of intestinal pathogens:
1. MPA
2. Lactose
3. Fuchsin
4. Fuchsin decolorized with sodium sulfite
5. None of the above

22. The genetic factor controlling the formation of enterotoxin by Escherichia coli:
1. Prophage
2. Pili
3. Capsule
4. Plasmid
5. O-antigen

23. The beneficial role of Escherichia coli for humans:
1. Participate in vitamin synthesis
2. Are antagonists of pathogenic microbes
3. Break down cellulose
4. Participate in protein synthesis
5. Affect lipid metabolism

24. The following are characteristic of cholera vibrios:
1. Rapid movement
2. Curved rod
3. Monotrich
4. Capsule formation
5. Peritrich

25. Pathogenicity factors of cholera vibrios:
1. Endotoxin
2. Enterotoxin
3. Pili
4. Hyaluronidase
5. Capsule

26. Enteropathogenic Escherichia coli cause the following diseases:
1. Coli-enteritis
2. Pyelitis
3. Dysentery-like
4. Cholera-like
5. Otitis

27. Cultural properties of Salmonella typhi, paratyphoid A, and B:
1. Fastidious about nutrient media
2. Facultative anaerobes
3. Grow on MPA
4. Obligate anaerobes
5. Colorless S-colonies on Endo medium

28. Nutrient media used in the diagnosis of dysentery:
1. Ploskirev
2. Russell
3. Selenite broth
4. Levin
5. Bismuth sulfite agar

29. Vibrios cholerae are characterized by:
1. Rapid movement
2. Curved rod
3. Monotrich
4. Capsule formation
5. Peritrich

30. Differentiation of foodborne pathogens from typhoid fever pathogens is based on:
1. Morphological features
2. Tinctorial properties
3. Antigenic structure

4. Enzymatic activity
5. Toxigenicity

31. Media used for the diagnosis of colibacillosis:
1. Casein-charcoal agar
2. Liver agar
3. Russell medium
4. Endo medium
5. Bismuth sulfite agar

32. Characteristics of differentiation between opportunistic and enteropathogenic Escherichia coli:
1. Morphological features
2. Biochemical activity
3. Antigenic structure
4. Cultural properties
5. Gram staining

33. Morphological characteristics of Shigella:
1. Possess pili
2. Form a capsule
3. Rounded ends
4. Do not form spores
5. Peritrichous

34. Tests for differentiating cholerae and cholerae-like vibrios:
1. Morphology
2. Gram staining
3. Antigenic structure
4. Cultural properties
5. Biochemical activity

35. Early diagnosis of typhoid fever, paratyphoid A and B is based on:
1. Infection of animals
2. Stool culture
3. Serological method
4. Blood culture
5. Skin allergy test

36. Sherichia are called opportunistic because:
1. They are natural inhabitants of the large intestine
2. They do not have pathogenic properties
3. They are Antagonists of pathogenic microbes
4. Participate in the synthesis of vitamins
5. Outside the large intestine, they cause purulent-inflammatory processes

37. Characteristics of differentiation between opportunistic and enteropathogenic Escherichia coli:
1. Morphological features
2. Biochemical activity
3. Antigenic structure
4. Cultural properties
5. Gram staining

38. The Kaufman-White classification of Salmonella is based on:
1. Biochemical activity
2. Antigenic structure
3. Tinctorial properties
4. Morphological features
5. Toxin formation

39. Salmonellosis is characterized by:
1. Development of gastroenteritis
2. Alimentary route of infection
3. Source of infection - animals
4. Anthroponotic disease
5. Short incubation period (up to 24 hours)

40. Differential feature of Salm. typhimurium and Salm. Enteritidis:
1. Morphology
2. Cultural characteristics
3. Carbohydrate metabolism
4. Protein metabolism
5. Antigenic properties

41. Dysentery is characterized by:
1. Large intestinal involvement
2. Tenesmus
3. Presence of mucus and blood in feces
4. Fecal-oral transmission
5. Small intestinal involvement

42. Necessary ingredients for serological diagnosis of dysentery:
1. Immune, diagnostic, and agglutinating sera
2. Diagnosticum consisting of different Shigella species
3. Patient serum
4. Pure culture isolated from patient feces
5. Saline solution

43. Motility, comparable to the flight of a swallow, which is a mandatory diagnostic test, is characteristic of:
1. Escherichia coli
2. Salmonella typhi
3. Shigella flexneri
4. Vibrio cholera
5. Helicobacter pylori

44. Characteristic properties of the causative agent of classical cholera:
1. Sensitivity to polymyxin
2. Agglutination with serum O1
3. Exhibits hemolytic activity
4. Sensitive to bacteriophage group IV of Mukherjee
5. Agglutination with serum O139

45. Phage typing of isolated typhoid bacilli is important for:
1. Effective specific therapy

2. Determining the virulence of Salmonella
3. Identifying the source of infection
4. Specific prophylaxis
5. Identifying the pathogen

46. Immunity in typhoid fever:
1. Humoral
2. Antitoxic
3. Antimicrobial
4. Cellular
5. Long-term

47. For emergency prophylaxis of typhoid fever, the following are used:
1. Immunoglobulin
2. Tetracycline
3. Chemical vaccine
4. Polyvalent typhoid bacteriophage
5. Colibacterin

48. Tests for differentiating different Shigella species:
1. Morphological features
2. Gram staining
3. Antigenic properties
4. Carbohydrate fermentation on Hiss medium
5. Indole formation

49. Rapid diagnostics of cholera:
1. Immunofluorescence reaction
2. Skin allergy test
3. Biological method
4. Immobilization reaction
5. Sowing on 1% alkaline peptone water

50. Drugs used to treat coli-enteritis:
1. Tetracycline
2. Colibacterin
3. Penicillin
4. Furazolidone
5. Coli-proteus bacteriophage

51. Immunity in dysentery:
1. Innate
2. Weak
3. Species-specific
4. Humoral
5. Local

52. For the prevention of dysentery in foci of infection, the following is used:
1. Immunoglobulin
2. Antitoxic serum
3. Bacteriophage
4. Killed vaccine
5. Chemical vaccine

53. Differential characteristics of biovars V. cholerae and V. eltor:
1. Sensitivity to specific phage
2. Antigenic properties
3. Agglutination of chicken Erythrocytes
4. Hemolysis of sheep erythrocytes
5. Growth on a medium with polymyxin

54. The following phases are distinguished in the pathogenesis of typhoid fever:
1. Bacteremia
2. Toxinemia
3. Excretory-allergic
4. Parenchymatous diffusion
5. Mesenteric lymphadenitis

55. Pathogenicity factors of Shigella:
1. Endotoxin
2. Exotoxin
3. Adhesion
4. Invasive capacity
5. Biochemical activity

56. Positive role of Escherichia for humans:
1. Participate in vitamin synthesis
2. Are antagonists of pathogenic microbes
3. Break down cellulose
4. Participate in protein synthesis
5. Affect lipid metabolism

57. Morphological features of typhoid and paratyphoid A bacilli and B:
1. Peritrichous
2. Rounded ends
3. Medium size
4. Form spores
5. Have a capsule

58. The following ingredients are used for the agglutination reaction for the serological diagnosis of typhoid and paratyphoid fever:
1. Pure culture isolated from the patient
2. Immune diagnostic typhoid-paratyphoid sera
3. Diagnostic solutions containing Salmonella typhi, Salmonella paratyphi A, and Salmonella paratyphi B bacteria
4. Patient serum
5. Saline solution

59. Cultural properties of Shigella:
1. Demanding of nutrient media
2. Alkali-loving
3. Facultative anaerobes
4. Colonies are colorless on Ploskirev medium
5. Enrichment medium - selenite Broth

60. Tests for differentiating different Shigella species:

1. Morphological features
2. Gram staining
3. Antigenic properties
4. Carbohydrate metabolism
5. Indole formation

61. Rapid diagnostics of cholera:
1. Immunofluorescence reaction
2. Skin allergy test
3. Biological method
4. Immobilization reaction
5. Sowing on 1% alkaline peptone water

62. For emergency cholera prophylaxis, the following is used:
1. Interferon
2. Immunoglobulin
3. Tetracycline
4. Anatoxin
5. Bacteriophage

63. Bacterial diagnosticum is used to determine:
1. Bacterial species
2. Morphological properties of bacteria
3. Antibodies in the patient's blood serum
4. Gastrointestinal tract infection
5. Hormonal sensitization therapy

64. The bacteremia phase of typhoid-paratyphoid infection corresponds to:
1. The peak of the disease
2. The period of parenchymatous diffusion
3. Recovery
4. Onset of the disease
5. The excretory-allergic period

65. Vibrio cholerae eltor differs from Vibrio cholerae classica in the following properties:
1. Morphological
2. The ability to lyse erythrocytes
3. Antigenic
4. Biochemical
5. Sensitivity to the corresponding bacteriophage and polymyxin

66. The most common causative agents of foodborne toxic infections are Salmonella:
1. Typhi murium
2. Paratyphi
3. Cholerae suis
4. Paratyphi B
5. Enteritidis

67. For typhoid-paratyphoid infections, the following specimens are required for examination:
1. Blood
2. Tonsillitis

3. Bile
4. Sputum
5. Feces

68. Enteroinvasive Escherichia coli causes the following diseases in humans:
1. Cholera-like
2. Dysentery-like
3. Pseudomembranous colitis
4. Typhoid-like
5. Colenteritis

69. Diagnostic immune antidysentery sera are used to determine the species:
1. Shigella
2. Salmonella
3. Escherichia
4. Yersinia
5. Klebsiella

70. To determine the type of foodborne pathogen, the following reactions are used:
1. Agglutination
2. Precipitation
3. Hemolysis
4. Bacteriolysis
5. Complement fixation

COLLOQUIUM No. 3 ON THE SECTION "ANAEROBIC, ZOONOTIC INFECTIONS, SPIROCHETOSIS, RICKETSIOSIS"

1. The material for the bacteriological method of studying relapsing fever is:
1. Sputum
2. Pus
3. Stool
4. Blood
5. Blood serum

2. Gas gangrene is an infection:
1. Epidemic
2. Wound
3. Zoonotic
4. Anaerobic
5. Aerogenic

3. The toxins of the causative agents of gas gangrene are determined by the reaction:
1. Agglutination
2. Complement fixation
3. Immunofluorescence

4. Neutralization in white mice
5. ELISA
4. Anatoxin is a vaccine against: 1. Measles
2. Whooping cough
3. Tetanus
4. Brucellosis

5. Tularemia

5. Clinical manifestation of the action of botulinum toxin is:
1. Tonic contractions of the masticatory and facial muscles
2. Accommodation disorder, double vision
3. Development of specific allergies
4. Tissue necrosis
5. Petechial rash

6. Rickettsia prowazekii is cultivated:
1. In bile broth
2. On serum agar
3. On susceptible animals
4. In cell culture
5. In chicken embryos

7. Brill's disease differs from epidemic typhus:
1. High IgG titer
2. Presence of pediculosis
3. Benign course
4. Isolated cases of the disease
5. Epidemic outbreak

8. Natural foci of plague in Kyrgyzstan:
1. Alay
2. Caspian
3. Transcaucasian
4. Tien Shan
5. Chuisky

9. The main symptoms of tetanus:
1. Uncontrollable vomiting
2. Clonic and tonic seizures
3. Ptosis
4. Hemorrhagic skin rash
5. Tenesmus, diarrhea

10. The vectors of relapsing fever are:
1. Cockroaches
2. Mosquitoes
3. Lice
4. Flies
5. Mosquitoes

11. The cause of tetanus infection is:
1. Criminal abortion
2. Dog bites
3. Eating unwashed vegetables
4. Unsterile injectables
5. Bullet, knife, and other wounds

12. The source of tularemia is:
1. Mice, rats

2. Hares, muskrats
3. Camels
4. Cats, dogs
5. Humans

13. Essential ingredients for serological diagnosis of brucellosis using the Wright agglutination test:
1. Immune diagnostic sera
2. Diagnosticum
3. Patient serum
4. Saline solution
5. Brucellin

14. The genus Treponema includes the causative agents of:
1. Cholera
2. Trichomoniasis
3. Syphilis
4. Leptospirosis
5. Relapsing fever

15. The main symptoms of primary syphilis:
1. Hemorrhagic rash
2. Convulsions
3. Hard chancre
4. Soft chancre
5. Diarrhea

16. Brill's disease differs from epidemic typhus:
1. High IgG titer
2. Presence of pediculosis
3. Benign course
4. Isolated cases of the disease
5. Epidemic outbreak

17. Morphologically, leptospires are characterized by:
1. Motility
2. Spiral shape
3. Presence of terminal hooks
4. Acid resistance
5. Presence of small curls

18. The STI anthrax vaccine contains:
1. Anatoxin
2. Inactivated microbes
3. Antigens
4. Spores of acapsular bacilli
5. Recombinant DNA molecules

19. The anthrax antigen in raw materials is detected using the following reaction: 1. Widal agglutination
2. Ascoli precipitation
3. Wasserman complement fixation
4. Mancini immunodiffusion

5. Bordet-Gengou complement fixation

20. The following is important for differentiating Brucella:
1. Bactericidal action of dyes
2. Agglutination reactions with monoreceptor sera
3. Hydrogen sulfide production
4. Respiration type
5. Lysis by TB phage

21. Clinical manifestation of the action of botulinum The toxin is:
1. Tonic contractions of the masticatory and facial muscles
2. Accommodation disorder, double vision
3. Development of specific allergies
4. Difficulty swallowing
5. Aphonia

22. Anthrax is treated with:
1. Antibiotics
2. Vaccine
3. Immunoglobulin
4. Interferon
5. Antitoxic serum

23. Factors contributing to the development of gas gangrene are:
1. Deep lacerations
2. Burns of the extremities
3. Blood loss
4. Prolonged application of a tourniquet (more than 2 hours)
5. Frostbite of the extremities

24. The causative agent of syphilis is characterized by:
1. Acid resistance
2. Paired arrangement of cells
3. Spiral shape
4. Capsule formation
5. Spore formation

25. Specific brucellosis prophylaxis includes:
1. Disinfection of animal products and raw materials
2. Detection and eradication of brucellosis in animals
3. Vaccination with the live BA-19 vaccine
4. Administration of specific immunoglobulin
5. Deratization and disinfestation

26. Antitoxic tetanus serum is obtained by hyperimmunization of a horse:
1. Killed tetanus bacteria culture
2. Tetanus exotoxin
3. Tetanus toxoid
4. Tetanus spasmin
5. Tetanolysin

27. Distinguishing features of anthrax carbuncle from staphylococcal carbuncle:
1. Painless

2. Painful
3. Purulent
4. Color Blue-green
5. No pronounced edema

28. For serological diagnosis of typhus, the following samples are taken from the patient:
1. Discharge from affected tissue
2. Isolated pure culture
3. Mucus from the pharynx
4. The patient's blood serum
5. Defibrinated blood

29. Treponema pallidum reproduces well:
1. On blood agar
2. In male rabbit testicular tissue
3. In cell culture
4. In the membranes of chicken embryos
5. On Endo medium

30. Deep, lacerations, burns, blood loss, and frostbite of the extremities are factors that contribute to the development of:
1. Botulism
2. Brucellosis
3. Pneumonia
4. Gas gangrene
5. Scarlet fever

31. Late forms of syphilis are characterized by:
1. The presence of infectious allergies
2. Particular danger to others
3. Localization of treponemas in brain tissue
4. Development of suppurative processes
5. Irreversible changes in the central nervous system

32. Infection with leptospirosis occurs through:
1. Swimming in open water
2. Using water from open water
3. Eating home-canned food
4. Working in water
5. Flea bites

33. For emergency specific prophylaxis of tetanus, the following is used:
1. Antibiotics
2. Bacteriophage
3. Interferon
4. Antibacterial serum
5. Antitoxic serum

34. Botulism develops through:
1. Bites of infected fleas
2. Eating unwashed vegetables
3. Contact with a sick person
4. Eating home-canned food

5. Butchering a sick animal

35. Morphological features of the plague pathogen:
1. Bipolar staining
2. Gram-negative
3. Gram-positive
4. Spore formation
5. Form a delicate capsule

36. The pathogenicity factors of Cl. perfringens are:
1. Exotoxin production
2. Capsule formation
3. Pathogenic enzymes
4. Biochemical activity
5. Presence of fimbriae

37. The causative agent of epidemic relapsing fever belongs to the genus:
1. Treponema
2. Mycobacterium
3. Nocardia
4. Borrelia
5. Leptospira

38. Identification of plague bacteria is carried out based on the definition of:
1. Smears: ovoid-shaped bipolar-stained rods
2. "Lace handkerchief" colonies
3. Lysis with a specific phage
4. Agglutination with a specific serum
5. "Pearl necklace" test

39. The causative agent of syphilis is characterized by:
1. Acid fastness
2. Paired cell arrangement
3. Spiral shape
4. Capsule formation
5. Spore formation

40. Brucella is characterized by:
1. Slow growth
2. Pronounced enzymatic activity
3. Growth on liver media
4. Antigenic homogeneity
5. Different oxygen requirements

41. Microbiological diagnosis of botulism includes:
1. Isolation and identification of a pure culture
2. Detection of the toxin in the test material
3. Cultivation under conditions of increased aeration
4. Determination of the serovar in the toxin neutralization test
5. Opsonophagocytic reaction

42. The anthrax bacillus is characterized by:
1. Demanding of nutrient media

2. "Lion's mane"-shaped colonies
3. Strict anaerobes
4. "Lace handkerchief"-shaped colonies
5. Loss of the cell wall on a medium containing penicillin

43. The causative agent of syphilis is characterized by:
1. Low resistance
2. Spore formation
3. Difficulty in cultivation
4. Cyst formation
5. Cultivation in chicken embryos

44. Botulism is an infection:
1. Food poisoning
2. Particularly dangerous
3. Natural focal
4. Zoonotic
5. Droplet

45. Endemic relapsing fever is characterized by:
1. Source – rodents
2. Colony growth in the form of a "lion's mane" on MPA
3. Zoonotic infection
4. Polyetiological infection
5. Wave-like course

46. The causative agent of syphilis is distinguished by:
1. High resistance
2. Presence of spores
3. Difficulty in culturing
4. Formation of a capsule
5. Formation of cysts

47. The causative agent of epidemic relapsing fever is:
1. Borrelia hispanica
2. Borrelia recurrentis
3. Borrelia caucasica
4. Borrelia duttoni
5. Borrelia persica

48. Late forms of syphilis are characterized by:
1. Presence of infectious allergy
2. Particular danger to others
3. Localization treponemes in brain tissue
4. Development of suppurative processes
5. Irreversible changes in the central nervous system

49. Leptospirosis is transmitted by:
1. Swimming in open water
2. Using water from open water
3. Eating home-canned foods
4. Working in water
5. Flea bites

50. The particular danger of plague is due to:
1. Natural foci
2. Severe course
3. High mortality
4. High contagiousness
5. Spore formation

51. Microbiological diagnosis of plague involves the following:
1. Immunofluorescence microscopy of the test material
2. Sowing the test material on MPA with gentian violet
3. Skin allergy testing
4. Detection of antibodies in the blood serum
5. Infection of experimental animals

52. The natural habitat of tetanus clostridia is:
1. Air
2. Intestine of herbivores
3. Soil
4. Food
5. Human intestine

53. The following are important for differentiating Brucella:
1. Bactericidal action of dyes
2. Agglutination reaction with monoreceptor sera
3. Hydrogen sulfide production
4. Respiration type
5. Lysis by TB phage

54. Physiological features of Leptospira:
1. Undemanding in nutrient media
2. Grow on a water-serum medium
3. Obligate anaerobes
4. Grow rapidly
5. Form cysts

55. Ptosis, dilated pupils, diplopia, dry mouth, difficulty swallowing, aphonia, and deafness are symptoms of:
1. Tetanus
2. Gas gangrene
3. Diphtheria
4. Mycoplasmosis
5. Botulism

56. For specific brucellosis prophylaxis, the following is used:
1. Disinfection of animal products and raw materials
2. Detection and eradication of brucellosis in animals
3. Vaccination with the live BA-19 vaccine
4. Administration of specific immunoglobulin
5. Deratization and disinfestation

57. For microbiological diagnosis of plague, the following is performed:
1. Immunofluorescence microscopy of the test material

2. Sowing the test material on MPA with gentian violet
3. Skin allergy testing
4. Detection of antibodies in the blood serum
5. Infection of experimental animals

58. Surgical debridement of wounds, early administration of polyvalent antitoxic serum, and oxygen therapy are measures necessary for the prevention and treatment of:
1. Anthrax
2. Leptospirosis
3. Actinomycosis
4. Gas gangrene
5. Chlamydia

59. Secondary syphilis is characterized by:
1. Progressive paralysis
2. Bacteremia
3. Hard chancre
4. Skin and mucous membrane rashes
5. Abundance of treponemes in the rash elements

60. Brill's disease is a relapse of:
1. Typhus
2. Relapsing fever
3. Typhoid fever
4. Q fever
5. Leptospirosis

61. Brucellosis affects the following systems:
1. Hematopoietic
2. Hepatosplenic
3. Musculoskeletal
4. Reproductive
5. Nervous

62. The causative agent of Q fever is characterized by:
1. Polymorphism
2. Growth on blood agar
3. Zdrodovsky stain
4. Reproduction in chicken embryos
5. Immobility

63. The clinical picture of epidemic typhus is characterized by:
1. Fever, intoxication
2. Roseola-petechial rash on the skin
3. CNS and cardiovascular damage
4. Spasmodic coughing fits
5. Gastroenteritis

64. Infection with leptospirosis occurs through:
1. Swimming in open water
2. Using tap water
3. Eating home-canned food
4. Working in a virology laboratory

5. Flea bites

65. The causative agent of epidemic typhus is Rickettsia:
1. Akari
2. Sibirica
3. Prowazekii
4. Typhi
5. Conori

66. The causative agent of botulism is characterized by:
1. Exotoxin production
2. Tennis racket shape
3. Absence of serotypes
4. Presence of flagella - peritrichous bacteria
5. Absence of a capsule

67. Morphological features of the causative agent of tularemia:
1. Cocci-shaped rods
2. Gram-negative
3. Form a delicate capsule in the body
4. Gram-positive
5. Form a spore

68. Laboratory diagnosis of brucellosis includes:
1. Microscopy of smears from pathological material
2. Isolation and identification of blood culture
3. Skin allergy testing
4. Opsonophagocytic reaction
5. Determination of antibodies in blood serum

69. Tetanus toxin is determined by the reaction:
1. Heddelson agglutination
2. Neutralization on white mice
3. Ascoli precipitation
4. Widal agglutination
5. Complement fixation

70. Secondary syphilis is characterized by:
1. Progressive paralysis
2. Tabes dorsalis
3. Hard chancre
4. Skin and mucous membrane rashes
5. Absence of treponemes in the rash elements

"COLLOQUIUM No. 4 ON THE SECTION "VIRUSES"

1. Primary reproduction of the hepatitis A virus occurs in:
1. Small intestinal mucosa
2. Liver cells
3. Blood
4. Brain
5. Skin

2. The live polio vaccine provides:
1. Local immunity of the nasopharyngeal and intestinal mucosa
2. Development of immunological tolerance
3. Circulation of serum immunoglobulins A
4. Development of delayed-type hypersensitivity
5. Cell-mediated immune response

3. Identification of the isolated rubella virus is performed using the hemagglutination inhibition test. Name the necessary ingredients:
1. Virus isolated in cell culture
2. Patient serum
3. Immune diagnostic rubella serum
4. Medium 199
5. Nasopharyngeal swab

4. The mumps virus is characterized by:
1. Damage to the salivary and parotid glands
2. Development of immediate hypersensitivity
3. Absence of CPE in cell culture
4. Cultivation on nutrient media
5. Damage to the cardiovascular system

5. The main features of oncornaviruses:
1. Consist of RNA, capsid, and supercapsid
2. Not transmitted from parents to offspring
3. Not activated by mutagenic or carcinogenic factors
4. Absence of type-specific antigens
5. Cause disruption of metabolic processes in the cell

6. Name the enzymes of HIV:
1. DNase
2. Reverse transcriptase
3. Neuraminidase
4. Protease
5. Integrase

7. Paramyxoviruses cause diseases:
1. Polio
2. Influenza
3. Parainfluenza
4. Mumps
5. Measles

8. Viral hepatitis A is characterized by:
1. Parenteral route of infection
2. Fecal-oral route of infection
3. Transition to a chronic form
4. Pronounced autumn-winter seasonality
5. Presence of immunopathology

9. Laboratory diagnosis of parainfluenza is carried out by detecting a specific antigen in the reaction:
1. Hemolysis
2. Bacteriolysis
3. Hemagglutination inhibition
4. Agglutination
5. Ring precipitation

10. Chickenpox is characterized by:
1. Fecal-oral route of infection
2. Natural focality
3. Development of a paroxysmal cough
4. Formation of Guarnieri bodies
5. Development of fetal abnormalities

11. Main routes of HIV transmission:
1. Sexual
2. Via bites of arthropod vectors
3. Airborne
4. Via blood products, syringes
5. Fecal-oral

12. Influenza virus antigens:
1. Fibrinolysin
2. Neuraminidase
3. Collagenase
4. Hemagglutinin
5. Reverse transcriptase

13. Methods of culturing the influenza virus:
1. By inoculating cell culture
2. Using enrichment media
3. Using chicken embryos
4. By intranasal infection of ferrets
5. Using elective media

14. Intrauterine infection of the fetus with the rubella virus in early pregnancy is characterized by:
1. A mild course of the disease, ending in recovery
2. Visual impairment – bilateral cataracts, glaucoma
3. Hearing impairment – deafness
4. Delay in physical and mental development
5. Prolonged viral shedding for up to 1.5-2 years

15. Hemorrhagic fever with renal syndrome differs from diseases caused by arboviruses:
1. Transmitted by blood-sucking insects
2. Infection occurs through the excrement of infected rodents
3. Characterized by the formation of immune complexes in the glomeruli and convoluted plexuses tubules
4. The pathogen is cultivated in the membranes of chicken embryos and cell culture.
5. The viral antigen is detected using immunofluorescence (IFA).

16. The recurrence of herpes infections is determined by the ability of the virus to:
1. Repeatedly replicate at the site of primary infection
2. Become active due to insolation and hypothermia
3. Remain active for a long time in epithelial cells
4. Asymptomatically persist in nerve ganglia
5. Produce antibodies that eliminate the pathogen from the body.

17. The clinical course of herpes type 1 is characterized by:
1. Alternating exacerbations in the form of rashes on the lips and sides of the nose
2. Clonic and tonic seizures
3. Recurrent course
4. Development of stomatitis, pharyngitis
5. Diarrhea

18. Characteristic properties of viruses:
1. Cellular structure
2. Two types of nucleic acid
3. Reproduction by fission
4. Absolute intracellular parasitism
5. Ability to grow on blood agar

19. Virus cultivation: 1. In cell culture, on chicken embryos
2. In simple nutrient media
3. Under anaerobic conditions
4. In 199 medium
5. In the body of susceptible animals

20. Fixed rabies virus:
1. A modified street (canine) rabies virus
2. Has a long incubation period of up to 1 year
3. Obtained by Pasteur by repeated passage through rabbit brain
4. A vaccine strain of rabies virus with persistently reduced virulence
for humans and other animals (except rabbits)
5. Used for the preparation of rabies vaccines

21. In assessing the immune status of HIV-infected individuals Characteristic:
1. A sharp decrease in the number of B-lymphocytes
2. Low T4/T8 levels
3. Increased phagocytic activity
4. An increase in the total relative number of lymphocytes
5. A sharp decrease in the number of erythrocytes

22. The integrative type of interaction (virogeny) includes:
1. Cytopathic action of the virus
2. Biosynthesis of viral components in the cell
3. Integration of viral nucleic acid into the cell chromosome
4. Exit of the virus from the cell
5. Cell death

23. The presence of the virus in cell culture can be determined by the presence of:
1. Characteristic colonies
2. Specific antibodies
3. Pathological changes in cells

4. Proteolytic enzymes
5. Toxins

24. The diagnostic feature of herpes infection is:
1. Detection of the virus in RIF, ELISA, RIA
2. The presence of giant multinucleated cells with intranuclear inclusions
3. Agglutination test
4. Increase in antibody titer in the complete blood count
5. Isolation of pure culture on nutrient media

25. Cytomegaloviruses are characterized by:
1. High sensitivity to interferon
2. Formation of giant cells
3. Persistence in the salivary glands and renal parenchyma
4. Formation of intranuclear inclusions
5. Teratogenic effect

26. Characteristic properties of viruses:
1. Cellular structure
2. One type of nucleic acid
3. Disjunctive mode of reproduction
4. Absolute intracellular parasitism
5. Possibility of integration into the cellular genome

27. Virus cultivation:
1. Artificial nutrient media
2. Chicken embryos
3. Cell cultures
4. Experimental animal organisms
5. Synthetic nutrient media

28. The main danger of the rubella virus is its ability to:
1. Be produced in the lymph nodes, causing them to enlarge and become painful
2. Penetrate the placenta and infect the fetus
3. Cause a rash of bright pink spots all over the body
4. Cause fetal death
5. Lead to severe deformities

29. The main characteristics of oncornaviruses:
1. Consist of RNA, a capsid, and a supercapsid
2. Are transmitted from parents to offspring
3. Are activated by mutagenic and carcinogenic factors
4. Lack type-specific antigens
5. Cause disruption of metabolic processes in the cell

30. Kuru "laughing death" is characterized by:
1. Pandemic spread
2. Presence of immune shifts
3. Short incubation period
4. Spongiform Encephalopathy
5. Associated with the consumption of uncooked brains of one's ancestors.

31. Disjunctive reproduction is characteristic of:
1. Bacteria
2. Fungi
3. Viruses
4. Protozoa
5. All of the above

32. Viral nucleic acid that has penetrated a cell:
1. Participates in the process of cell division
2. Carries new genetic information
3. Disorganizes the functioning of cellular systems
4. Suppresses the cell's own metabolism
5. Forces the cell to synthesize viral proteins and nucleic acids

33. When assessing the immune status of AIDS patients, the following is characteristic:
1. A sharp decrease in the number of T-helper lymphocytes
2. Low T4/T8 levels
3. Increased phagocytic activity
4. An increase in the total relative number of lymphocytes
5. A sharp decrease in the number of erythrocytes

34. Epstein-Barr viruses, cytomegaloviruses, Varicella-zoster viruses belong to the family:
1. Poxviridae
2. Togaviridae
3. Rabdoviridae
4. Herpesviridae
5. Retroviridae

35. Progressive sclerosing panencephalitis (SSPE) is characterized by high levels of antibodies to the virus:
1. Rubella
2. Herpes
3. Measles
4. Encephalitis
5. Polio

36. Shingles occurs in a person who has had:
1. Herpes simplex
2. Infectious mononucleosis
3. Smallpox
4. Chickenpox
5. Burkitt's lymphoma

37. Creutzfeldt-Jakob disease:
1. Acute bacterial infection
2. Slow prion infection
3. Characterized by progressive dementia
4. Found worldwide.
5. Transmitted through meat, the brain of sheep and cows with spongiform encephalopathy, as well as through oysters and mollusks.

38. Viruses are identified in cell culture by:
1. CPE
2. Colony pattern
3. Agglutination reaction
4. Hemagglutination inhibition reaction
5. Biochemical reactions

39. Hepatitis B virus is characterized by:
1. Double-stranded RNA
2. Defective DNA
3. Presence of DNA polymerase
4. Absence of supercapsid
5. Presence of supercapsid

40. Influenza virus is characterized by:
1. Fragmented single-stranded RNA
2. Double-stranded DNA
3. Cubic symmetry
4. Medium size
5. Antigenic variability

41. Material for research in mumps is:
1. Bile
2. Pus
3. Sputum
4. Saliva
5. Feces

42. Diagnosis of prion diseases is based on:
1. Identification of the clinical picture
2. Determination of epidemiological data
3. Isolation of the pathogen and identification by antigenic properties
4. Serological testing
5. Allergic method

43. Persistence is:
1. Hematogenous spread of microorganisms
2. Autoimmune process
3. Immediate hypersensitivity
4. Long-term persistence of the virus in the body without clinical manifestations
5. None of the above

44. The following are used to cultivate the influenza virus:
1. Chicken embryos
2. Blood agar
3. Cell cultures
4. Kitt-Tarozzi medium
5. Laboratory animals

45. Microscopic cytopathic effect of viruses in cell culture manifests itself as:
1. Preservation of cell morphology
2. Formation of giant multinucleated cells (symplasts)
3. Complete destruction of cells

4. Pyknosis of nuclei
5. Focal fine-grained degeneration

46. The diagnostic features of herpes infection are:
1. The presence of Guarnieri bodies in skin cells
2. The presence of giant multinucleated cells with intranuclear inclusions
3. Agglutination test
4. Toxin formation
5. Isolation of a pure culture on nutrient media

47. The following methods are used to diagnose cytomegalovirus infection:
1. Blast transformation
2. Biological
3. Plasmolysis
4. Cell culture
5. Allergic

48. A relapse in the form of a localized vesicular rash along a nerve (shingles) occurs after childhood:
1. Smallpox
2. Genital herpes
3. Chickenpox
4. Cytomegalovirus infection
5. HIV infection

49. A drug for active specific Hepatitis B prevention:
1. Killed vaccine
2. Genetically engineered vaccine
3. Toxoid
4. Live vaccine
5. Immunoglobulin

50. In adenovirus infection:
1. Virus reproduction occurs in the cells of the mucous membranes of the respiratory tract and intestines
2. Exudative-fibrinous inflammation of the mucous membranes develops with the formation of a film and necrosis
3. The virus has a teratogenic effect
4. Some serotypes cause tumor transformation of cells
5. Allergization of the body is accompanied by the development of asthmatic bronchitis

51. Properties characteristic of the poliovirus:
1. RNA genomic
2. Small size
3. Icosahedral symmetry
4. Presence of a supercapsid
5. DNA genomic

52. Properties characteristic of the hepatitis virus A:
1. RNA genomic
2. Small size
3. Cubic symmetry
4. Absence of supercapsid

5. DNA genomic

53. Acquired cytomegalovirus infection in adults and children manifests as:
1. Mononucleosis
2. Hippo-like disease
3. Osteomyelitis
4. Pneumonia
5. Hepatitis

54. Hepatitis B virus antigens:
1. Capsular
2. Protective
3. HBe
4. HBs
5. HBc

55. The clinical course of herpes type 1 is characterized by:
1. Alternating exacerbations in the form of rashes on the lips and sides of the nose
2. Clonic and tonic seizures
3. Dehydration
4. Development of dementia
5. Diarrhea

56. Which microorganisms have oncogenic properties:
1. Viruses
2. Fungi
3. Protozoa
4. Chlamydia
5. Spirochetes

57. Prions:
1. Induce a purulent-inflammatory process
2. Have a viral structure
3. Are sensitive to antibiotics
4. Are a protein infectious particle
5. Have a cellular structure

58. For passive immunoprophylaxis of hepatitis A, the following is used:
1. Immunoglobulin
2. Antitoxic serum
3. Autoimmune vaccine
4. Anatoxin
5. Interferon

59. Necessary ingredients for RBI to determine the poliovirus serotype:
1. Virus isolated in cell culture
2. Patient serum
3. Three types of immune diagnostic antipolio sera
4. Medium 199
5. Cerebrospinal fluid

60. Acute congenital CMV infection:
1. Occurs in late pregnancy

2. Characterized by a triad of lesions: jaundice, hepatosplenomegaly, hemorrhagic purpura
3. Leads to fetal death
4. Causes the development of microcephaly and hydrocephalus
5. Manifests gradually over several years after birth

61. Kuru is an endemic slow human prion infection characterized by:
1. Severe damage to the immune system
2. Transformation of the brain into a spongy mass
3. Progressive impairment of motor coordination with severe tremors
4. Mild course and complete recovery
5. Spread through ritual cannibalism

62. Prion diseases include (all correct except): 1. Kuru
2. Creutzfeldt-Jakob disease
3. Familial fatal Insomnia
4. Kaposi's sarcoma
5. Spongiform encephalopathy

63. The mumps virus belongs to the family:
1. Togaviruses
2. Picornaviruses
3. Orthomyxoviruses
4. Herpesviruses
5. Paramyxoviruses

64. Street rabies virus:
1. Highly pathogenic for carnivores and humans
2. Obtained by Pasteur by repeated passage through rabbit brain
3. Causes the formation of Babes-Negri bodies in neurons of the brain of sick animals and humans
4. Does not differ in antigenic composition from the fixed virus
5. Used to prepare rabies vaccines

65. The hepatitis B virus is characterized by:
1. Double-stranded RNA
2. Defective DNA
3. Presence of DNA polymerase
4. Absence of supercapsid
5. Presence of supercapsid

66. Structures containing infectious proteins with a low molecular weight, not having Nucleic acids that do not cause inflammation and an immune response are:
1. Viruses
2. Chlamydia
3. Prions
4. Rickettsia
5. Fungi

67. The family Rabdoviridae, genus Lissavirus include viruses:
1. Smallpox
2. Herpes
3. Measles
4. Rabies

5. Yellow fever

68. Routes of transmission of hepatitis B:
1. Airborne
2. Alimentary
3. Transmissible
4. Sexual
5. Parenteral

69. The mechanism of transmission of poliomyelitis:
1. Contact
2. Transmissible
3. Fecal-oral
4. Airborne
5. None of the above

70. Coxsackie A virus on the mucous membranes of the oral cavity causes:
1. Vincent's ulcerative necrotic stomatitis
2. Frequently confluent superficial erosions
3. Purulent inflammation of the gingival pockets
4. Vesicular lesions on the posterior pharyngeal wall with dysphagia and anorexia
5. Serous hemorrhagic inflammation with severe edema

Block B
CASE STUDY PROBLEMS
Topic: "INFECTION AND INFECTIOUS IMMUNITY"

1. A bacteriological examination of a patient's tonsil mucus yielded a culture of Corynebacterium diphtheriae. What tests should be used to determine its toxigenicity? How is the reaction recorded? What units are used to measure the toxin's potency?
2. The laboratory received a sample (nasopharyngeal swab) from which swabs were prepared to detect the influenza virus. What immunological test can be used for rapid diagnostics? How should this reaction be performed and recorded?
3. The laboratory received samples of cattle hides from a tannery to detect contamination of the raw materials with the anthrax pathogen. What serological reaction should be used to detect the pathogen's antigens in the test material? Can this test be used to detect pathogens in other diseases, and if so, in which ones?
4. The laboratory received blood from a patient with suspected gonorrhea. A complete blood count (CFC) test is required to confirm the diagnosis. What ingredients are needed to perform this test, and how are they obtained? How is a positive or negative test result assessed?
5. A nasopharyngeal swab from a patient with suspected influenza received by the laboratory. A neutralization test needs to be performed for diagnostic purposes. What ingredients are needed to perform this test? How should the test be performed and recorded?
6. The Institute of Vaccines and Serums needs to prepare diphtheria antitoxic serum. How are antitoxic serums prepared? What are their purposes and how are they used?
7. The Institute of Vaccines and Serums needs to obtain agglutinating polyvalent and monovalent typhoid serums. What is needed for this? How are agglutinating serums obtained?
8. Patient A., 9, was hospitalized in the infectious diseases hospital with a diagnosis of diphtheria. His condition is extremely serious, due to the action of the pathogen's exotoxin. To detoxify the patient, an antitoxin must be administered. How is the antitoxin obtained? How should this serum be administered to the patient to prevent anaphylactic shock? Explain the mechanism.

9. To prevent diphtheria and tetanus, children are routinely immunized with the corresponding toxoids. How are the toxoids obtained? Why is revaccination (repeated administration of these toxoids) performed? Explain the mechanism.
10. A 23-year-old patient, M., came to the emergency room after injuring his leg while watering the garden. The doctor treated the deep wound, applied a bandage, and prescribed antitetanus serum and toxoid to prevent infection. Explain how the toxoid and antitoxin are obtained. How should they be administered to the patient?
11. The Mantoux tuberculin test of a 12-year-old child was positive. After 48 hours, a lesion developed at the tuberculin injection site, manifesting as redness, swelling, and an infiltrate measuring 22 mm in diameter. Explain what allergic reactions the Mantoux tuberculin test is and why it is performed. What is the mechanism of an allergic reaction?

Topic: "CLINICAL BACTERIOLOGY"
SECTION I. PURULENT INFECTION AGENTS

1. Staphylococcus aureus was isolated from a patient with a high fever and a diagnosis of left-sided otitis media when blood was cultured in sugar broth. How can the staphylococcus species be determined?
2. Patient N., 28, developed a temperature of 39.5°C after severe hypothermia, chills, headache, shortness of breath, and a cough. Sputum culture on blood agar revealed small, grayish, round colonies with depressed centers and a zone of hemolysis. Name the suspected pathogen and describe the subsequent bacteriological examination.
3. Sputum examination of patient K. (diagnosis: crippling pneumonia) revealed capsular diplococci. Describe the further examination and identification of the pathogen. 4. Patient A., 15, presented with wound discharge. Culture on Endo medium revealed red colonies with a metallic sheen. What is the bacteriologist's next course of action to identify the pathogen?
5. Sputum culture on milk-yolk-salt agar revealed golden colonies with a cloudy halo around them. What is the next step in the investigation?
6. Pus was collected from patient K., suffering from erysipelas of the leg. Outline the plan for the bacteriological examination.
7. Wound discharge was presented from patient M., 23. Diagnosis: Suspected anaerobic infection. Culture on Kitt-Tarozzi medium revealed turbidity and vigorous gas formation. Describe the next steps in the investigation.
8. Patient N., 9, has a suppurating wound on his left foot and is experiencing convulsions. A smear of the wound fluid revealed gram-positive rods with terminally located spores. How should the pathogen be isolated and identified?

SECTION II. "CAUSATIVES OF BACTERIAL RESPIRATORY INFECTIONS"

1. Patient K., 30, suffers from a chronic lung disease. After 14 days of sputum culture on Lowenstein-Jensen medium, dry, rough, cream-colored colonies appeared on the surface of the medium. Justify your tentative diagnosis. What additional tests are needed to confirm the diagnosis?
2. Patient K., 52, has a chronic inflammatory process in the cervical lymph nodes: the lymph nodes are enlarged and there is a fistula emitting pus. Microscopy of the pus revealed drusen. What additional tests can be performed to definitively establish the diagnosis? 3. A 5-year-old child, A., was admitted to the infectious diseases department in a serious condition: temperature 39°C, severe intoxication, moderate pain when swallowing, a dirty-white coating on the tonsils, enlarged submandibular lymph nodes. For laboratory diagnostics, swabs were taken from the throat and nose and cultured on plates with Clauberg medium. After 48 hours, heterogeneous colonies grew: a) gray, flat, dryish, R-shaped, with radial striation, crumbling when taken with a loop, 3.5-4 mm in diameter. Microscopy of a

smear prepared from the colonies and stained according to Loeffler revealed rods of a characteristic shape and arrangement; b) dark, slightly convex, moist, small, S-shaped colonies. The smear shows cocci arranged in clusters. Indicate a tentative diagnosis and plan further investigation.
4. A child's throat mucus culture on Clauberg's medium revealed thin rods with thickened ends. The cystinase test was positive. What characteristics can be used to differentiate the isolated culture?
5. A 15-year-old patient. Diagnosis: Cerebrospinal meningitis. The cerebrospinal fluid is cloudy; bacterioscopy reveals leukocytes containing bean-shaped bacteria. How can the pathogen be identified? Indicate a tentative diagnosis.
6. A culture of nasopharyngeal mucus on serum agar with ristomycin from a patient with nasopharyngitis yielded delicate, small colonies with a bluish tint. The smear contains gram-negative cocci. What is the pathogen? How to identify the pathogen?
7. A 20-year-old female patient was admitted with a temperature of 39°C, a flushed face, severe headache, neck stiffness, and intermittent vomiting. The patient is lying on her side with her knees drawn up to her stomach and her head tilted back. Provide a presumptive diagnosis and microbiological confirmation.

SECTION III. "CAUSATIVES OF INTESTINAL INFECTIONS"

1. A 2-year-old child, V., has frequent loose stools, a fever, and intoxication. A stool culture on Endo medium revealed round, red colonies with a metallic sheen. How can the pathogen be identified?
2. Patient A., 20, has had a high temperature of 39°C for 7 days. Blood (5 ml) was collected from the cubital vein and inoculated into bile broth (50 ml). How should further microbiological testing be performed to identify and detect the pathogen?
3. Patient V., 27, suddenly developed a temperature of 38°C overnight, vomiting, diarrhea, abdominal pain, and headache. The previous day, he had eaten roast duck in the cafeteria for lunch. What infection can be suspected? Outline the bacteriological examination scheme.6
4. Patient K. has had a high fever, confusion, lethargy, and drowsiness for 5 days. A patient from this family was admitted with similar clinical symptoms weeks earlier. A gram-negative bacillus isolated from the blood behaves in relation to carbohydrates as follows: it does not ferment lactose, but ferments glucose, mannitol, and maltose to form acid without gas, and produces hydrogen sulfide. What is this pathogen? What else is needed to make a definitive diagnosis?
5. Child M., 6 months old. Complaints (according to the mother) of frequent regurgitation, vomiting, frequent loose stools, and weight loss. Stool culture on Endo medium revealed red colonies. On Russell medium, the entire medium discolored, and gas formed. How should the analysis be continued? What disease could this be?
6. Patient A., 47, was admitted to the infectious diseases hospital complaining of severe weakness, nausea, double vision, and headache. The day before, the patient had visited her friend K., where she was treated to stewed meat with pickles, tea, and cake. In the morning, the patient felt weak, vomited twice, and had constipation. On examination, the patient was pale, with pronounced ptosis, a tight left nasolabial fold, dilated pupils, and a cold, clammy sweat covering her skin. Blood pressure was 80/55 mm Hg, and her pulse rate was weak at 120 beats per minute. The abdomen was distended and slightly tender in the epigastric region. What was the tentative diagnosis? What was the cause of the illness? What was the laboratory test plan (test material, methods)? What emergency care should be provided to the patient? 7. Patient I., 18, complains of abdominal pain, nausea, loose stools 5 times a day, sometimes mixed with mucus and blood, and a severe headache. Laboratory examination of stool on Endo medium revealed the growth of pink colonies with smooth and jagged edges containing gram-negative non-motile rods. On Russell medium, these rods completely changed color on

the third day; gas was absent. What is your opinion on the diagnosis? What pathogen was isolated? Based on what characteristics can the pathogen be definitively identified?
8. Journalist N., 36, returned from a business trip to India and felt unwell: headache, weakness, frequent vomiting, diarrhea, and calf muscle cramps developed. Temperature is 35.8°C. Make a tentative diagnosis and outline a laboratory examination plan. 9. Patient K., 47, developed severe dehydration due to uncontrollable vomiting and diarrhea up to 30 times per day. Examination of liquid, milky-white feces revealed a rapidly motile microorganism in a crushed drop. When the vomit and feces were cultured in alkaline peptone water after 6 hours, a soft film formed. When cultured on alkaline agar, the colonies were transparent with a bluish tint. Indicate the presumptive diagnosis. Develop a plan for further investigation. Indicate the methods for identifying the type of pathogen.
10. Student M., 22, fell ill while working on the farm. He developed a fever of 38°C, headache, weakness, cramping abdominal pain, diarrhea, and tenesmus. The stool contains a lot of mucus and streaks of blood. Provide a tentative diagnosis and plan laboratory diagnostics.
11. Child O., 5, developed a fever of 38°C, abdominal pain, and frequent loose stools mixed with mucus and blood. A stool culture revealed a gram-negative bacillus that does not ferment lactose but ferments maltose, mannitol, and glucose to form acid, forming indole. Provide a tentative diagnosis. What other methods should be used to identify the pathogen?
12. Patient N., 50; A patient has had a high temperature (38-39°C), severe headache, and poor sleep for 2 weeks. Stool culture on bismuth sulfite agar revealed growth of black, round, S-colonies. Provide a presumptive diagnosis and plan for further investigation.
13. A gram-negative, motile rod isolated from the blood of a febrile patient does not ferment lactose; it ferments glucose, maltose, and mannitol with the formation of acid, producing hydrogen sulfide. Determine the causative agent. What else is needed for a definitive identification?
14. A 3-month-old child, M., developed a fever, vomiting, and diarrhea. The child is bottle-fed and receives formula from a milk kitchen. Stool culture on Endo medium revealed growth of red colonies. Provide a presumptive diagnosis and plan for further investigation.
15. Patient K., 47, complains of weakness, vomiting, and double vision. She is pale, has low blood pressure, slurred speech, and a flattened left nasolabial fold. The day before, she ate sausage and home-canned pickled mushrooms. What is the presumptive diagnosis, laboratory materials, and the course of the examination? What is the emergency care for this condition?

SECTION IV. "CAUSATIVES OF ZOONOTIC INFECTIONS"

1. Blood from the cubital vein of patient D., 48, was cultured in liver broth. After 7 days of incubation in a thermostat, subculture onto liver agar yielded small, colorless, round, convex colonies with a pearlescent hue. A smear revealed small gram-negative coccobacilli and very short, non-motile rods. Provide a preliminary diagnosis and outline further investigation.
2. A blood culture was obtained on day 8 of subculture from liver broth onto liver agar. The colonies are small, round, convex, colorless, with a pearlescent hue. A smear from the colonies contains small gram-negative rods. When identifying a pure culture, the following was noted: a) growth at elevated carbon dioxide concentrations, b) formation of hydrogen sulfide, c) growth on media supplemented with fuchsin and not on media containing thionine, d) lysis by Tb phage, e) does not ferment carbohydrates, e) agglutination by specific monoreceptor sera. Draw a conclusion based on the analysis results.
3. Patient A., 40 years old, shepherd. Has been ill for 4 months. Fever, chills, and sweating occur periodically. Enlargement of the liver and all lymph nodes is noted. Blood culture in liver broth yielded no growth. The patient underwent the Burne test. After 48 hours, an infiltrate 20 mm in diameter was detected at the injection site. Make a preliminary diagnosis and explain the mechanism of the Burne test. What other tests should be undertaken to diagnose the disease? 4. A sample of pus from a carbuncle belonging to patient A., 30, was collected. Gram-stained smear microscopy revealed large, gram-positive rods, located singly,

in pairs, or in chains, surrounded by a capsule. Justify the preliminary diagnosis and describe the further course of investigation.
5. Patient A., 37, a tannery worker. A carbuncle covered with a black scab was discovered on the dorsum of his forearm. The disease began with the appearance of an itchy papule, then a vesicle. Swelling is severe. Temperature is 39°C. What is the suspected cause? How can the pathogen be isolated and the diagnosis confirmed?
6. Patient B., 40, was admitted to the infectious diseases department with a diagnosis of cutaneous anthrax. An epidemiological investigation revealed that three days before the illness, two rams were slaughtered. The animal skins are at home. How can the source of infection be determined? What anti-epidemic measures should be taken?
7. A sample was collected: pus from a carbuncle of patient D., 50 years old. The pus was cultured in a microbiological broth. After 20 hours of incubation at 37°C, a flocculent sediment without turbidity appeared in the broth. A smear of the sediment revealed large gram-positive rods with truncated ends, arranged in a chain. Justify the preliminary diagnosis. How can the culture be identified?
8. Patient D., 35 years old, a worker at a raw animal procurement center. The patient developed a sudden illness with a fever of 39°C, chills, headaches, chest pain, shortness of breath, and a cough with difficult-to-expect serous-hemorrhagic sputum. A sputum smear revealed large, gram-positive, capsule-forming rods arranged in a chain. Justify the preliminary diagnosis and outline a laboratory testing plan.
9. When the pus was cultured for MPA after 24 hours, gray, dry, rough colonies with jagged edges grew. Identification of the isolated culture revealed the following properties: Gram-positive rods arranged in a chain, non-motile, do not cause hemolysis on blood agar, form a capsule in a medium with added protein, causing death in mice within 24-28 hours. On MPA with penicillin, the microbial cells acquire a spherical shape and are arranged in a chain, and are lysed by a bacteriophage. Identify the microbial species.
10. Patient M., 50 years old. Three weeks ago, he suffered from an illness accompanied by a high temperature and the appearance of a carbuncle on the dorsum of his left hand. To establish a retrospective diagnosis, 0.1 ml of anthraxin was injected into the inner surface of his forearm. After 24 hours, skin hyperemia and an infiltrate 12 mm in diameter were noted at the injection site. Explain the test results.
11. Patient P., 28, a livestock specialist at a fur farm. He became ill suddenly: his temperature rose to 39°C, along with chills, headache, nausea, pain in the right hypochondrium, and an enlarged liver. Thick drop preparations were made from the patient's citrated blood. Dark field microscopy revealed spiral-shaped microorganisms with small whorls, rapidly rotating around their longitudinal axis. Explain your presumptive diagnosis and plan for further testing.
12. Patient P., 27, has been ill for a week. The illness began acutely: a fever of 39°C, chills, headaches, nausea, and pain in the right hypochondrium. The day before his illness, he had repeatedly swum in a pond located near a livestock farm. Blood from the cubital vein at the patient's bedside was inoculated into 0.5 ml of 5 test tubes containing 10% aqueous serum medium. Incubation was carried out at 28°C. Daily observation of the cultures revealed no turbidity, but dark-field microscopy of the nutrient medium revealed spiral-shaped microorganisms with small curls, rapidly rotating around their longitudinal axis. Make a tentative diagnosis. What additional steps are needed to identify the pathogen?
13. Material was collected: pus from the bubo of patient A., 30 years old. Microscopy of the smear reveals medium-sized (1-2 μm), gram-negative, polymorphic, often ovoid, bipolar-stained rods located among leukocytes. Make a preliminary diagnosis and determine the further course of examination. What are the working conditions for this material?
14. Patient D., 40, has a temperature of 39°C, chills, headache, and enlarged, fused inguinal lymph nodes that are acutely painful. The surrounding skin and tissue are edematous and fused to the nodes. Culture of material obtained from the bubo revealed the growth of small, colorless colonies with a compacted center and scalloped, lacy edges. Make a preliminary diagnosis and determine the plan for further examination.

15. Material to be examined: blood of patient B., 40. Culture was performed at the Moscow City Hospital. Incubation at +25°C. Subculture from MPB to MPA yielded small, colorless colonies with compacted centers and scalloped, lacy edges after 24 hours. A smear from the colony reveals medium-sized, gram-negative, polymorphic, bipolar-stained rods. Make a preliminary diagnosis and determine a plan for further testing.
16. The test material is pus from the bubo of a 30-year-old patient. Culture of the material on a nutrient medium yielded no growth. Intraperitoneal infection of a guinea pig with pus resulted in the death of the animal on the 5th day. Small gram-negative coccobacilli are visible in impression smears from the organs. Small, convex, smooth colonies with smooth edges, whitish with a bluish tint, were grown from the guinea pig's organs on yolk medium 48 hours after inoculation. Make a diagnosis.
17. Patient M., 30, developed an acute illness: fever, headache, muscle aches, moderate sore throat on the left side, difficulty swallowing, enlarged tonsils with necrotic plaque. Submandibular, parotid, and cervical lymph nodes are enlarged and painful. The skin over the buboes is normal and not fused with the lymph nodes. The patient had been haymaking for a week before the illness. A skin allergy test with tularin performed a week later was positive (10 mm). Make a tentative diagnosis and outline a plan for examining the patient.

SECTION V. "REPELLING FEVER AND RICKETSIOSIS"

1. A patient has had a high fever for a week. A thick blood smear revealed microorganisms in the form of thin, curved filaments with 4-8 large, irregular curls, purple in color. What disease is this? What other laboratory diagnostic methods can be used?
2. A patient has had a high fever for a week. Blood cultures on nutrient media showed no growth. Inoculation of a chicken embryo into the yolk sac, followed by smear preparation and staining with Zdrodovsky's method, revealed small, red microorganisms. Make a tentative diagnosis and plan further examination of the patient.
3. Patient N. was admitted with complaints of a fever of 38-40°C for a week and a severe headache. Pediculosis was detected. A few days later, a profuse roseolous-petechial rash appeared on the patient's skin. Make a presumptive diagnosis and determine a plan for bacteriological and serological examination of the patient.
4. Patient K., 35, was admitted with complaints of a fever (38-39°C) for 8 days, headache, cough with a small amount of sputum, and chest pain. A chest X-ray showed increased pulmonary markings. A titer of 1:16 was obtained in the agglutination reaction with Coxiella burnetii antigen. What other methods can be used to diagnose the disease?
5. Patient I. was admitted with complaints of a fever of 39-40°C for a week and a severe headache. A profuse roseola-petechial rash was found on the patient's skin. According to the patient, he had a similar disease 5 years ago and was diagnosed with typhus. Make a presumptive diagnosis and determine the patient's laboratory examination plan.

SECTION VI. "Venereal Diseases"

1. Patient K. complains of pain during urination and purulent discharge from the urethra. Gram-stained urine sediment revealed gram-negative diplococci. What disease is this? What other laboratory tests can be used to diagnose the disease?
2. When cervical discharge was cultured on a medium supplemented with ascitic fluid, after 24-48 hours, transparent, delicate, small colonies with smooth edges and a shiny surface appeared. Gram-stained smears from the colonies revealed gram-negative cocci. Make a diagnosis. What other laboratory tests can be used to diagnose this disease?
3. When examining pus from the urethra, bean-shaped gram-negative diplococci were found in leukocytes. Make a tentative diagnosis and plan further examination of the patient.
6. Patient K.'s urethral swab cultured on a nutrient medium supplemented with tryptic digest of bovine heart, yeast extract, and penicillin yielded colonies shaped like fried eggs. Identify the pathogen.

7. The patient developed a painless ulcer with a firm base on his penis. A smear of the ulcer's discharge, stained according to Buri's method, revealed colorless microbes with small, uniformly curled shapes. Make a tentative diagnosis. What other laboratory diagnostic methods should be used?
9. A 38-year-old man has chronic, poorly treatable urethritis. No gonococci were detected in a urethral smear. Chicken embryos were inoculated in the yolk sac, and inclusions were found in the smears. What is the tentative diagnosis? What other methods can be used to diagnose the disease?

Topic: "Virology"

SECTION I. "Influenza and Acute Respiratory Viruses"

1. The laboratory has received material (nasopharyngeal swab) from a patient with a suspected respiratory viral infection. What biological samples should be used to isolate viruses? What methods can be used to identify the virus? What other methods are used to make a diagnosis?
2. A patient with a preliminary diagnosis of influenza is being treated in an infectious diseases hospital. A chicken embryo was infected with the patient's nasopharyngeal swab. The embryo died. After dissection of the embryo, identify the material to determine the type of virus. What reaction is used for this purpose?
3. The laboratory has received nasal swabs from a patient with a suspected adenovirus infection. What laboratory tests are needed to confirm the diagnosis, and how? 4. The laboratory received a sample of nasopharyngeal swab from a patient with suspected respiratory syncytial infection. What tests should be performed to confirm the diagnosis?
5. Patient S., 17, developed a sudden fever, weakness, headache, catarrhal symptoms in the respiratory tract, and lacrimation. Cell culture of nasopharyngeal swabs revealed cerebral plaques (CPP) in the form of giant multinucleated grape-like cells. What disease is this? What is your plan for further investigation?
6. Patient D., 18, developed a high fever, weakness, and copious nasal discharge. A nasal swab was taken and cultured. In cell culture, the material induced CPE in the form of giant multinucleated cells and syncytia containing cytoplasmic inclusions. What disease are we talking about, and what is your plan for further research?

SECTION II. "ENTEROVIRUSES AND HEPATITIS VIRUSES"

1. A 4-year-old child developed a moderate fever and catarrhal symptoms. A few days later, as the temperature dropped, the child developed pain and twitching in the muscles of the lower limb, followed by flaccid paralysis of the lower limb. What material should be collected for testing? What is your laboratory diagnostic plan?
3. A culture of viruses with cytopathic properties was isolated from the patient's stool. What immunological tests can be used to type the isolated viruses? 4. A patient with a presumptive diagnosis of enterovirus infection was admitted to the infectious diseases hospital. What virological methods are needed to clarify the diagnosis and identify the pathogen?
5. The laboratory received material from a patient with suspected hepatitis B (week of illness). What methods are used to isolate the HBS antigen? What additional tests can be performed in the event of a negative HBS antigen identification test result?
6. A 6-year-old child with a preliminary diagnosis of poliomyelitis was admitted to the children's infectious diseases hospital. The child attends kindergarten. Specify laboratory diagnostic methods and measures to prevent transmission among contacts.
7. Patient V., 27 years old. Complains of headache, fever, and loose stools. Objectively: the patient has positive meningeal symptoms and a rash on the trunk and extremities. Blood culture on serum agar shows no growth. Stool culture on monkey kidney cells shows cerebral palsy. What is your presumptive diagnosis? Specify laboratory diagnostic methods and tests to identify the pathogen.
8. Patient A., 18 years old, complains of general weakness, poor appetite, nausea, vomiting, a feeling of heaviness in the right hypochondrium, and itching. On examination: the tongue is

coated with a grayish color, the whites of the eyes and skin are jaundiced. The patient has a history of a blood transfusion during surgery four months ago. What is your presumptive diagnosis? What should be taken from the patient for laboratory testing? What tests should be used? What infections should be treated and how should they be differentiated?
9. A patient with a temperature of 38°C, nausea, and vomiting was admitted to the infectious diseases hospital. The patient has a history of a blood transfusion three months ago. On examination, the whites of the eyes and skin are jaundiced. What is the presumptive diagnosis? Develop a plan and methods for further testing to confirm the diagnosis.
10. Nurse S., 35, from Talas, was admitted with complaints of weakness, lethargy, pain in the right hypochondrium, loss of appetite, slightly jaundiced skin and whites, and an enlarged liver. The patient has a history of an emergency direct blood transfusion four months ago. It was later discovered that the donor had hepatitis C virus in his blood. What is your presumptive diagnosis? Differentiate it from other types of parenteral hepatitis.
11. Patient B., 4 years old, was admitted to the hospital complaining of vomiting, nausea, loss of appetite, dark urine, and an enlarged liver. The child attends a kindergarten where there have been cases of hepatitis for one month. What is your presumptive diagnosis? Confirm the diagnosis with laboratory tests. What preventive measures should be taken at the kindergarten?
12. Pregnant woman P., 24 years old, was admitted to the hospital in serious condition complaining of nausea, vomiting, weakness, loss of appetite, and a feeling of heaviness in the right upper quadrant. The liver is enlarged and painful, and the urine is darker than beer. She is 22 weeks pregnant. What is your presumptive diagnosis? What laboratory tests should be performed to differentiate between hepatitis types and confirm the diagnosis?

SECTION III. "ARBOVIRUSES AND RABIES VIRUS"

1. A patient with lacerations from a bite by a rabid animal was admitted to a medical facility. What measures should be taken to prevent the development of rabies?
2. An 8-year-old child was bitten by a dog. Examination revealed lacerations on the right calf muscle and right hand. According to the victim's parents, the dog belongs to neighbors, is kept on a leash, and is apparently healthy. What is your approach?
3. A dog suspected of having rabies was admitted to the laboratory. What material can be used to diagnose the disease? What testing methods should be used to confirm the diagnosis?
4. A patient with lacerations on the head was admitted to a medical facility following an attack by a neighbor's dog. What measures should be taken to diagnose and prevent the disease?
5. Patient V., 42 years old. He returned from a business trip to Africa two days ago. Complaints of high fever, chills, weakness, yellowing of the sclera, liver enlargement, and hemorrhagic rashes on the mucous membranes. What disease could this be? What laboratory tests are needed to diagnose the disease?
6. Patient S., 27 years old. Three days ago, he returned from logging in the Omsk Region. Complaints of fever with chills, bleeding, and hemorrhagic rashes. What is your presumed diagnosis? What laboratory tests should be used to clarify the diagnosis?
7. Patient A., 24 years old. Complaints of fever, development of paralysis of the right upper limb, and sleep disturbances. History: prolonged stay in the Ala-Archa Gorge, worked as a gamekeeper in a forest park. Objectively: mental disorder, development of encephalomyelitis, paralysis of the upper limb. What disease are we talking about? What laboratory tests are needed to confirm the diagnosis?
8. Patient D., 29, complains of a sharp rise in temperature. Objectively: flushing of the face and eyes, hemorrhagic rash, nosebleeds, and hemoptysis. He returned from Crimea a few days ago, where he works as a forestry technician. What is your diagnosis? What laboratory tests are needed to confirm the diagnosis?
9. Worker M., 20, was hospitalized in an infectious diseases hospital with a presumptive diagnosis of tick-borne encephalitis. Conduct virological diagnostics to confirm the diagnosis.

10. A patient with suspected dengue fever was admitted to the infectious diseases hospital. How should laboratory diagnostics be performed to confirm the diagnosis?

SECTION IV. "MEASLES, RUBELLA, HERPES, VARICKEN POX AND CHICKEN POX VIRUS"

1. Patient O., 6 years old. Complains of neck pain and swelling. On examination: enlarged parotid glands, without pus. The child attends a kindergarten where there was an outbreak of an infectious disease a week ago. What is your diagnosis and what is your laboratory testing procedure? What measures should be taken at the kindergarten?
2. Patient M., 19 years old. Complains of neck swelling and testicular inflammation. Objectively: enlarged parotid glands, both parotid glands, and an enlarged left testicle. What is your diagnosis and what is your laboratory testing procedure?
3. A patient with a presumptive diagnosis of measles was admitted to the infectious diseases clinic. What laboratory tests should be performed to confirm the diagnosis?
4. Patient L., 8 years old. Complains of fever, runny nose, and cough. Objectively: hemorrhagic rash on the skin and mucous membranes, conjunctivitis, Filatov-Koplik spots on the buccal mucosa. What is your diagnosis? How can you confirm the diagnosis?
5. After suffering from the flu, patient M. developed a rash in the form of small blisters filled with a cloudy fluid on the wings of her nose and lips. What is your diagnosis? What additional tests can be used to clarify the diagnosis?
6. Patient M., 35, developed a fever of 38°C and developed tingling, burning, and pain along the intercostal nerves. By evening, closely grouped blisters with clear contents began to form at the aforementioned sites. What disease is this? How can a viral antigen be detected in the sample?

Block C
INDIVIDUAL CREATIVE ASSIGNMENTS
TOPICS FOR ESSAYS, REPORTS WITH PRESENTATIONS, ROUND TABLES

The student independently selects a report topic in accordance with the section topic:
1. Modern methods of rapid diagnostics in medical microbiology.
2. Microbial evolution.
3. Ways to overcome drug resistance in microbes.
4. Limitations on the use of drugs in pregnant women and children.
5. The human body's microflora throughout life and its role in normal physiological processes and pathology.
6. The microflora of air, water, and soil and its impact on the human body.
7. Production of new antimicrobial drugs using genetic engineering.
8. Production of autovaccines, bacteriophages, and mycophages using biotechnology.
9. Genetic engineering and the application of its achievements in human life and medical microbiology.
10. Types of symbioses between different organisms.
11. Features of antibacterial immunity.
12. Features of antiviral immunity.
13. Features of antifungal immunity.
14. Features of antiparasitic immunity.
15. Autoimmune diseases.
16. Autoantigens.
17. The role of staphylococci in the development of generalized processes in children in the first year of life.
18. Lyell's syndrome.

19. The role of streptococci in the development of immune inflammation of connective tissue and in the development of rheumatism.
20. Classification of mycobacteria.
21. Pathogens of keratomycosis (epidermophytosis, microsporia, trichophytosis): morphological and biological properties, diagnosis, treatment, and prevention.
22. Pathogens of dermatomycosis – types, morphological and biological properties, diagnosis, treatment, and prevention.
23. Pathogens of subcutaneous mycoses (sporotrichosis, mycetoma): morphological and biological properties, diagnosis, treatment, and prevention.
24. Pathogens of deep visceral mycoses (histoplasmosis, coccidioidomycosis, crytococcosis): morphological and biological properties, diagnosis, treatment, and prevention.
25. The role of Escherichia coli in the pathology of children in the first year of life.
26. The role of Proteus and Klebsiella in human pathology.
27. Particularly dangerous (EDI) and quarantine infections: characteristics, properties of microbes, criteria for selecting causative agents of especially dangerous infections, diagnostic principles. Measures at the site of EDI.
28. Modern classifications of rickettsioses.
29. Atypical pneumonia viruses: their role in human pathology. Laboratory diagnostics, therapy, and prevention.
30. Foot-and-mouth disease viruses. Pathogenesis. Laboratory diagnostics, therapy, and prevention.
31. Principles of therapy and prevention of HIV infection and AIDS. Difficulties in developing drugs for treatment and prevention.
32. Congenital HIV infection.
33. Ebola virus. Pathogenesis of the disease. Laboratory diagnostics. Therapy and prevention.
34. HTLV – human T-lymphotropic viruses. Pathogenesis of the disease. Laboratory diagnostics. Therapy and prevention.
35. Toxoplasma. Types. Pathogenesis of the disease. Diagnostics. Therapy and prevention. Teratogenic effects of microbes on the fetus.
36. Malaria plasmodium. Types. Development cycles. Pathogenesis of the disease. Diagnostics. Therapy and prevention.
37. Leishmania. Species. Disease pathogenesis. Diagnosis. Therapy and prevention.
38. Giardia. Disease pathogenesis. Diagnosis. Therapy and prevention.
39. Amoebas. Species. Disease pathogenesis. Diagnosis. Therapy and prevention.
40. Trichomonas. Species. Disease pathogenesis. Diagnosis. Therapy and prevention. 41. Dysbacteriosis. Factors influencing its development. Diagnosis. Treatment and prevention.
42. Opportunistic infections: etiologic factor, disease development mechanism, diagnosis, treatment and prevention principles.
43. Childhood viral infections. Features of antiviral immunity. Challenges in developing drugs for antiviral therapy.

Block D

QUESTIONS FOR CURRENT MONITORING of the "KNOW, BE ABLE TO, MASTER" LEVEL:

Knowledge Assessment Questions KNOW:
3rd Semester
1. Taxonomy and nomenclature of microorganisms.
2. Prokaryotes (bacteria) and their differences from eukaryotic microbes (protozoa and fungi) by structure, chemical composition, and function.
3. Taxonomic categories: kingdom, division, family, genus, species. Intraspecific categories: biovar, serovar, phagovar, morphovar. Population, culture, strain, clone.

4. Bacterial morphology. Basic shapes (coccoid, rod-shaped, coiled) and sizes of bacterial cells.
5. Permanent and temporary structures of bacterial cells: nucleoid, cytoplasm, ribosomes, cytoplasmic membrane, mesosomes, cell wall; spore, capsule, pili, flagella, inclusions. 6. Chemical composition and functional significance of individual organelles.
7. Differences in the structure of gram-positive and gram-negative bacteria. Protoplasts, spheroplasts, and L-forms of bacteria.
8. Basic methods for studying bacterial morphology: light microscopy with an immersion objective, darkfield, phase-contrast, and fluorescence microscopy.
9. Preparation of bacterial preparations.
10. Simple and complex staining methods. Gram, Ziehl-Neelsen, Orzeszka, Neisser, Burri-Gins, and other staining methods.
11. Structural features of actinomycetes, spirochetes, rickettsia, chlamydia, and mycoplasmas. Bacterial nutrition. Sources of nitrogen, carbon, minerals, and growth factors. Autotrophs and heterotrophs.
12. Mechanism of nutrient transfer into bacterial cells (simple and facilitated diffusion, active transport).
13. Bacterial respiration. Aerobic and anaerobic types of biological oxidation.
14. Bacterial growth and reproduction. Mechanisms and rate of reproduction. Phases of microbial reproduction in a liquid nutrient medium under stationary conditions.
15. Colonies. Features of their formation in different bacterial species.
16. Nutrient media (simple, special, differential diagnostic, elective, selective). Requirements for nutrient media.
17. Principles and methods for isolating pure cultures of aerobic and anaerobic bacteria. Methods for creating anaerobiosis.
18. Stages of isolating pure bacterial cultures and their identification. Antibiotics. Definition of the concept, requirements for antibiotics. Microbial antagonism and its mechanisms. 19. Classification of antibiotics by chemical structure, origin, production methods, mechanism, and spectrum of antimicrobial action.
20. Methods for studying the antibiotic susceptibility of bacteria (serial dilution method, agar diffusion).
21. Bacterial genetics. Organization of the genetic material of a bacterial cell: bacterial chromosome (nucleoid), plasmids, transposons, insertional elements. Differences between the genomes of prokaryotic and eukaryotic cells. Concept of genotype and phenotype. Types of variability in bacteria. Modification variability, its mechanisms, and forms of manifestation in bacteria.
22. Genotypic variability. Mutations in bacteria and their varieties. Mechanisms: deletion, translocation, inversion, duplication, insertion.
23. Genetic recombination. Transformation, transduction, and conjugation.
24. Microbiological foundations of genetic engineering and biotechnology.
25. Microorganisms producing biologically active substances.
26. Virus structure. Virus reproduction. Virus cultivation methods. Bacterial viruses (bacteriophages).
27. The theory of the infectious process. The role of microorganisms in the infectious process. Forms of interaction between micro- and macroorganisms: mutualism, commensalism, parasitism.
28. Pathogenicity of microorganisms. Virulence, units of measurement. Pathogenicity factors.
29. Nonspecific factors of human defense (cellular and humoral).
30. Classification of staphylococci and streptococci.
31. Morphology, cultural properties, and biological characteristics of staphylococci and streptococci. Pathogenicity toxins and enzymes, methods for their determination.

Diseases caused by staphylococci and streptococci. Microbiological diagnostic methods. Specific prevention and specific therapy.
32. Morphology, cultural properties, antigenic structure, and toxin production of meningococci, gonococci, chlamydia, and mycoplasmas. Diseases, sources, and routes of transmission. Pathogenesis. Microbiological diagnostic methods. Specific prevention and therapy.
33. Corynebacterium diphtheriae – morphology, cultural biochemical properties, toxin production, and lysogeny. Properties of diphtheria bacillus toxin. Localization of diphtheria bacteria in the body and the pathogenesis of diphtheria. Microbiological diagnostic methods for diphtheria. Immunity in diphtheria and methods for its assessment. Drugs for specific prevention and therapy, their production, and use.
34. Morphology, cultural properties, antigenic structure, and toxin production of Bordetella. Diseases, sources, and routes of transmission. Pathogenesis. Microbiological diagnostic methods.
35. Specific prevention and therapy. Current classification of mycobacteria. Causal agents of human tuberculosis. Morphology, antigen structure, pathogenicity factors. Sources, routes of infection, and pathogenesis of tuberculosis. Methods of microbiological diagnosis of tuberculosis. Features of immunity in tuberculosis. Specific prevention.
36. Main features of the causative agent of leprosy. Sources, routes of infection, pathogenesis, clinical picture. Laboratory diagnostic methods.
37. Actinomycetes: morphology, cultivation, antigen structure. Pathogenesis of the disease in humans. Laboratory diagnostic methods for actinomycosis.

IV Semester
1. Current classification of the Enterobacteriaceae family.
2. Morphological and cultural properties of Escherichia coli. Antigens. Their chemical nature and localization in bacterial cells. Diseases caused by enteropathogenic Escherichia coli. Microbiological diagnostic methods. Opportunistic Escherichia coli, their physiological role in the human intestine, and their sanitary significance. Distinguishing opportunistic Escherichia from enteropathogenic Escherichia.
3. Modern international classification of Shigella. Morphology, cultural properties, and toxin formation. Shigella antigens, their chemical composition, and main properties. Sources of infection, routes of transmission, pathogenesis, and main symptoms of dysentery. Microbiological diagnostic methods for dysentery. Treatment and specific prevention of dysentery.
4. Agents of typhoid-paratyphoid diseases and foodborne toxic infections. Morphological and cultural properties, toxin formation, and antigenic structure. Pathogenesis and nature of immunity. Microbiological diagnostic methods. Specific prevention and treatment of typhoid-paratyphoid diseases.
5. Salmonella pathogens. Sources and routes of infection. Pathogenesis. Microbiological diagnostic methods for salmonellosis.
6. Classification of cholera pathogens. Biovars. Morphological, cultural, biochemical, and antigenic properties. Epidemiology. Pathogenesis and clinical presentation of cholera.
Microbiological diagnostic methods. Specific prevention and therapy.
7. Obligate clostridial anaerobes. Pathogens of gas gangrene, tetanus, and botulism, their morphological and cultural properties, toxins, and pathogenic enzymes. Mechanism of infection, pathogenesis, and clinical presentation. Microbiological diagnostic methods. Specific therapy and prevention of anaerobic infections.
8. Particularly dangerous infections. Plague and tularemia pathogens. Morphological and cultural characteristics. Pathogenicity factors. Sources and routes of transmission.

Pathogenesis and clinical presentation. Microbiological diagnostic methods. Procedure for studying infectious diseases. Drugs for treatment and specific prophylaxis.

9. Morphology, cultural properties, toxin formation, and antigenic structure of anthrax bacteria. Source of infection. Routes of infection. Pathogenesis and clinical presentation. Microbiological diagnostic methods. Specific prophylaxis and specific therapy for anthrax. Classification of brucellosis.

10. Morphology, cultural properties, toxin formation, antigenic structure, and biochemical activity of brucellosis. Source of infection and routes of transmission of brucellosis. Clinical forms. Microbiological diagnostic methods for brucellosis. Specific prophylaxis and therapy for brucellosis. Classification of spirochetes and their role in human pathology.

11. Biological characteristics of Treponema pallidum and its cultivation features. Pathogenesis of the disease and the nature of immunity in syphilis. Microbiological diagnosis of syphilis, a set of serological tests (screening and confirmatory).

12. Morphological and cultural characteristics of the causative agents of epidemic and endemic relapsing fever. Source of infection, routes of transmission. Pathogenesis and nature of immunity. Microbiological diagnosis of relapsing fever.

13. Classification of leptospires and their role in human pathology. Epidemiology. Pathogenesis and nature of immunity in leptospirosis. Microbiological examination of leptospirosis and determination of the species and type of leptospira. Drugs used for the specific prophylaxis of leptospirosis. Classification of rickettsioses.

14. Rickettsia prowacekii and Rickettsia muserii – the causative agents of epidemic and endemic typhus, their biological characteristics. Brill-Zinsser disease.

15. Coxiella burnetii – the causative agent of Q fever. Specific prevention of rickettsioses.

16. Viruses. Acute respiratory infections (ARVI). Orthomyxoviruses, their general characteristics. Size, structure, symmetry type, influenza virus genome, variability (shift and drift), epidemiological significance. Pathogenesis of influenza, the main stages of intracellular viral replication. The main clinical manifestations of influenza, complications. Microbiological diagnostic methods. Treatment and prevention of influenza.

17. Paramyxoviruses: parainfluenza, respiratory syncytial virus, coronaviruses, adenoviruses, measles, mumps.

18. Picornaviruses: polio, coxsackievirus, echovirus, hepatitis A. General characteristics of enteroviruses. Epidemiology. Pathogenesis. Clinical presentation. Microbiological diagnostic methods. Treatment and prevention of enteroviral diseases.

19. Hepatitis B, C, D, F, G, TTV, and SEN viruses. Structure, antigens, enzymes, and reproductive characteristics.

Epidemiology, pathogenesis, and clinical presentation. Microbiological diagnostic methods. Specific prevention and therapy.

20. Human immunodeficiency virus (HIV): structure, genome, symmetry type, and variability. Pathogenicity factors. Reproductive characteristics. Mechanism of human immunodeficiency development. Stages of HIV infection. Clinical manifestations. ELISA, RIA, and PCR in the diagnosis of HIV infection. Treatment and prevention.

21. Arboviruses: Togaviridae, Flaviviridae, Bunyaviridae, and Rhabdoviridae. Structure and basic biological properties. Epidemiology, pathogenesis, and clinical presentation. Microbiological diagnostic methods. Specific prevention and therapy.

22. Herpesviruses. Classification, structure, chemical composition, antigens, cultivation, and reproduction. Epidemiology. Pathogenesis. Clinical presentation. Microbiological diagnostic methods.

23. Smallpox. Classification, structure, chemical composition, antigens, cultivation, and reproduction. Epidemiology. Pathogenesis. Clinical presentation. Microbiological diagnostic methods.

24. Oncogenic RNA and DNA genomic viruses. Classification and characteristics. Mechanism of oncogenesis.
25. Slow viral and prion infections. Characteristics. Mechanism of development and manifestations.
26. Principles of microbiological diagnostics. Protozoa, classification, and their general characteristics. Pathogenic representatives of each class of protozoa. Morphological and physiological characteristics.

Questions to assess your level of knowledge: BE ABLE TO:

3rd Semester

1. Conduct a bacterioscopic examination using an immersion system. Set up the microscope and workstation.

2. Prepare a smear from a bacterial culture and perform a simple stain.
3. Conduct a bacterioscopic examination of prepared smears from cultures of staphylococci, streptococci, Escherichia coli, and anthrax bacteria using an immersion microscope system.
4. Sketch the main shapes of spherical, rod-shaped, and curved bacteria.
5. Prepare a smear from dental plaque using the Burri method, examine it with a microscope, and sketch it.
6. Gram stain preparations prepared from cultures of staphylococci, Escherichia coli, and their mixtures.
7. Prepare a smear from sputum from a tuberculosis patient and stain it using the Ziehl-Neelsen method.
8. Stain smears of spore-forming microbes using the simple and complex method (according to Orzeszko).
9. Prepare smears from sputum of a pneumonia patient and stain them using the simple method; from a pure culture of capsular microbes, use the Burri-Gins method.
10. Stain prepared smears from a diphtheria bacillus culture using the Loeffler and Neisser methods and draw them.
11. Prepare "crushed drop" and "hanging drop" preparations and examine them under a phase-contrast and ultramicroscope (dark-field microscopy).
12. Observe sanitary, hygienic, anti-epidemic, and safety regulations in the bacteriology laboratory.
13. Prepare disinfectant and antiseptic solutions for decontaminating infected material and for cleaning the hands of laboratory personnel. 14. Sterilize utensils, instruments, and nutrient media (in a Pasteur oven or autoclave).
15. Prepare basic nutrient media (PPB (MPB) and PPA (MPA) for culturing microorganisms.
16. Select the correct nutrient medium based on the diagnostic purpose.
17. Collect test material from children and adults (sputum, pus, blood, urine, feces, throat swabs, etc.) for microbiological examination.
18. Take swabs from hands and environmental objects (utensils, tabletop, surgical instruments, etc.) for sanitary and bacteriological examination.
19. Inoculate the test material on liquid and solid nutrient media to obtain isolated colonies.
20. Isolate a pure culture of pathogens – aerobes and obligate anaerobes. Evaluate the results of the bacteriological examination.
21. Differentiate microbes by morphological, cultural, enzymatic, and pigment-forming properties.
22. Study the sensitivity of an isolated microbe to antibiotics. Prepare a chicken embryo for infection with virus-containing material.

23. Infect a chicken embryo in various ways, dissect it, and perform virus detection and identification.
24. Prepare a cell culture (primary trypsinized single-layer culture from a chicken embryo and continuous culture).
25. Infect the cell culture. Perform virus detection and identification. Conduct experiments with phages on solid and liquid nutrient media.
26. Understand the mechanisms of non-hereditary and hereditary types of variability. Conduct experiments on genetic recombination – transformation, transduction, conjugation.
27. Logically explain the essence of molecular genetic methods for diagnosing diseases (probe method, PCR).
28. Conduct a phagocytosis experiment. Determine the activity and completeness of the phagocytic reaction.
29. Detect incomplete phagocytosis in prepared smears of pus from a patient with acute gonorrhea.
30. Autopsy and bacteriologically examine the corpses of mice that died from an experimental infection.
31. Prepare smears from mouse organs, Gram stain them, examine them under a microscope, identify pathogens, and draw conclusions.
32. Using prepared demonstrations: determine the hemolytic activity of staphylococci on blood agar, the lecithinase activity of staphylococci on YSA; evaluate the plasma coagulation reaction of staphylococci. Correctly select and collect material for research in accordance with the properties of the pathogen and the pathogenesis of the disease. Prepare smears and slides for microscopy. Determine the staining technique and stain the slide. Differentiate cocci in slides.
33. Select nutrient media for culturing gonococci and meningococci, perform cultures, and identify bacterial growth patterns for their initial identification. Isolate a pure culture from characteristic colonies. Determine the morphological, biochemical, and antigenic properties of the isolated pure bacterial culture. Determine the sensitivity of microbial cultures to antibiotics.
34. Select material for examination corresponding to the location of lesions, observing aseptic and biosafety rules if mycoplasmas are suspected. Culture the sample on appropriate nutrient media and isolate a pure culture based on the characteristic features of the colonies.
35. Prepare smears and slides for staining and microscopy. Differentiate Neisseria in slides. Determine the antibiotic sensitivity of isolated Neisseria cultures. Properly collect specimens for testing—scrapings (not swabs) from the walls of the urethra and cervix (cervical secretions).
36. Prepare slides for microscopy and detection of chlamydial and mycoplasmal antigens in affected cells using immunofluorescence. Detect specific antichlamydial and antimycoplasmal antibodies in patient serum using ELISA and RIGA.
37. Collect specimens for diphtheria testing, taking into account the pathogenesis, clinical manifestations, and the time of delivery to the bacteriology laboratory. Use selective nutrient media for culturing diphtheria and whooping cough pathogens for inoculation. Based on the characteristic features of the grown colonies, isolate a pure culture, test for toxigenicity, and perform tests to identify the diphtheria and whooping cough pathogens. Prepare and stain slides for microscopy, selecting staining methods that allow for the detection of characteristic morphological features. Determine the sensitivity of isolated pure cultures to antibiotics using the disk diffusion method.
38. Prepare sputum slides and stain them using the Ziehl-Neelsen stain. Develop a scheme for the bacteriological study of tuberculosis and actinomycosis, identifying and differentiating the pathogens. Differentiate between opportunistic (non-tuberculous) mycobacteria that cause mycobacteriosis.

39. Prepare a smear and stain it to detect characteristic morphological features (septate hyphae, tightly packed spore layers, microconidia, yeast cells with spores, yeast-like cells with pseudomycelium).

Semester IV

1. Cultivate feces on Endo and Ploskirev media. Determine colony growth on Endo and Ploskirev media and isolate pure cultures from characteristic colonies. Record the results of culturing the pure culture on Giss and MPB media. Conduct an agglutination reaction with immune diagnostic sera (Escherichia coli and Shigella). Isolate blood, urine, and stool cultures. Identify the isolated pure cultures by morphological, biochemical, and antigenic properties. Interpret the results of serological tests.
2. Conduct microbiological and immunological diagnostics of cholera. Differentiate pathogenic vibrios from cholerae-like bacteria and serovars of Vibrio cholerae. Determine the sensitivity of vibrios to bacteriophages. Observe safety precautions and rules for working with infectious material posing a particular biological hazard. Ensure public protection during epidemic outbreaks.
3. Proper collection of test material for laboratory diagnostics and testing for the isolation of anaerobic pathogens;
Develop a bacteriological method for testing gas gangrene, tetanus, and botulism; Identify by cultural properties; Determine the types of exotoxin of gas gangrene and botulism pathogens; Adhere to the operating procedures in specialized laboratories when testing patients and objects for the presence of plague (quarantine infection), which poses a particular biological hazard;
4. Develop a bacteriological diagnostic procedure for plague and tularemia; Identify and differentiate cultures of plague and tularemia bacteria from similar microorganisms using ready-made demonstration preparations; Evaluate the results of serological tests to determine antibodies in the blood serum of patients with tularemia; Assess the results of the Ascoli thermoprecipitation reaction and determine the presence of anthrax antigen in the test material.
5. Assess the results of the Heddelson and Wright reactions; Select nutrient media for culturing anthrax and brucellosis pathogens, perform cultures, identify characteristic colonies, and isolate pure cultures;
6. Differentiate epidemic typhus from endemic typhus and Brill-Zinsser disease;
7. Justify the choice of test material for virological and serological testing. Prepare a specimen for rhinocytoscopy and immunofluorescence. Develop a laboratory diagnostic protocol for acute respiratory viral infections (influenza, measles, mumps). Conduct detection and identification of acute respiratory viral infections in infected chicken embryos and in cell culture. Conduct serological tests with paired sera for retrospective diagnosis of acute respiratory viral infections.
8. Justify the choice of test material for virological and serological methods of testing enteroviral infections. Develop a laboratory diagnostic procedure for enteroviral infections. Conduct detection and identification of enteroviruses in cell culture using sample materials. Conduct serological reactions with paired sera for retrospective diagnosis of enteroviral infections.
9. Justify the choice of test material for diagnosing enteric and parenteral hepatitis. Develop a laboratory diagnostic procedure for detection and identification of pathogens. Consider ELISA and RIA serological reactions for diagnosing hepatitis using sample materials in wells of polystyrene panels.
10. Justify the choice of test material for diagnosing HIV infection and develop a laboratory diagnostic procedure. Justify the choice of test material for diagnosing arbovirus infections and develop a laboratory diagnostic procedure.
Questions to assess your level of knowledge: MASTER:

3rd Semester

1. Rules for working in a microbiology laboratory and methods for disinfecting waste material.
2. Basic skills for working with materials containing pathogenic and opportunistic microorganisms.
3. Basic skills for working with modern equipment used for sterilization (autoclave, dry-heat chamber); for creating anaerobic conditions (anaerobic jar, desiccator); for culturing microorganisms (thermostat).
4. Methods for identifying microorganisms in sputum smears and pure cultures. Methods for differentiating the main groups of microorganisms in finished preparations (by the presence of spores, capsules, inclusions). 5. Techniques for seeding and subculture of microorganisms in nutrient media (liquid and solid) to obtain isolated colonies and isolate pure cultures of aerobic and anaerobic bacteria.
6. Methods for identifying and differentiating pure cultures to the microorganism species level, taking into account the morphological, tinctorial, cultural, biochemical, toxigenic, and antigenic properties of infectious disease pathogens.
7. Rules for preparing a protocol substantiating the diagnosis.
8. Methods for interpreting microbiological test results and determining the antimicrobial activity of chemotherapeutic drugs, along with microbiologically sound rules for their use.
9. Techniques for preparing cell cultures from chicken embryos.
10. Interpretation of virus culturing results in chicken embryos and cell culture.
11. Interpretation of visible virus manifestations during culturing in chicken embryos and cell culture.
12. Interpretation of phage experiment results to identify microbial species. 13. Interpretation of genetic recombination experiment results.
14. Interpretation of PCR results.
15. Ability to assess the significance of the infectious process.
16. Assess the significance of nonspecific immune factors.
17. Methods for interpreting microscopic examination results and serological tests for chlamydia and mycoplasmosis.

IV Semester

1. Methods for differentiating the causative agents of Escherichia coli and Shigellosis based on morphological, biochemical, and antigenic properties
2. Rationale for the use of eubiotics in the treatment of intestinal infections
3. Basic methods of sterilization, disinfection, and antiseptic treatment of instruments and equipment for particularly dangerous infections
4. Methods for interpreting the results of microbiological and immunological studies and determining the antimicrobial activity of therapeutic drugs and their selection for prescribing them for the treatment of patients
5. Methods for selecting anti-cholera immunobiological drugs for adequate cholera prophylaxis
6. Rapid diagnostics of plague; allergic test for tularemia;
7. Serological diagnostics of tularemia and the necessary ingredients
8. Method for determining the contamination of raw materials (wool, skins, fur) with anthrax bacilli; evaluation of the results of serological tests to detect antibodies in the blood serum of patients with brucellosis;
9. Performing the Heddelson reaction;
10. Interpret the results of serological tests for syphilis (microprecipitation tests, the VDRL test used for preventive population screening; RIBT, RIF (direct and indirect variants), and ELISA as diagnostic tests). Wasserman reaction; microprecipitation test with cardiolipin antigen; PCR reaction for syphilis;

rickettsia agglutination test (RAR); Interpretation of serological test results.
11. Selecting drugs for the diagnosis, treatment, and specific prevention of acute respiratory viral infections. Selecting drugs for the diagnosis, treatment, and specific prevention of measles and mumps.
12. Interpretation of the results of visible manifestations of enteroviruses during cell culture.
13. Interpretation of the results of serological tests in the diagnosis of enterovirus infections, hepatitis A and E.
14. Selection of drugs for the diagnosis, treatment, and specific prevention of enterovirus infections, hepatitis A and E.
15. Interpretation of the results of serological tests in the diagnosis of hepatitis B, C, D, and HIV infection.
16. Selection of drugs for the diagnosis, treatment, and specific prevention of hepatitis B, C, D, and HIV infection.
17. Interpretation of the results of microbiological diagnostics of rabies.
18. Selection of drugs for the diagnosis and specific prevention of rabies.
19. Selection of drugs for the diagnosis, treatment, and specific prevention of herpesvirus infections.
20. Interpretation of microbiological diagnostic results for smallpox.
21. Skills in working with infectious diseases and quarantine infections.
22. Selection of drugs for the diagnosis and specific prophylaxis of smallpox.
23. Interpretation of microbiological diagnostic results for slow-acting diseases.
24. Interpretation of microbiological diagnostic results for virus-induced tumors.

TEST QUESTIONS AND ASSIGNMENTS FOR THE INTERIM CERTIFICATION:

3rd Semester

TEST #1 ON BACTERIAL MORPHOLOGY

TEST QUESTIONS

1. The subject and objectives of microbiology, the main stages in the development of microbiology. Research by Samoylovich, Pasteur, Koch, Mechnikov, Ivanovsky, Zilber, Zdrodovsky, Ermolyeva, Ehrlich, and Bordet.
2. Taxonomy and nomenclature of bacteria. Basic principles of microorganism classification. The concepts of genus, species, subspecies, serovar, chemovar, and phagevar.
3. What do the microbiological terms mean: population, clone, strain?
4. Microscopic examination methods. Microscopes: biological, fluorescent, phase-contrast, electron, and ultramicroscope - their design and operating principles. Immersion system.
5. The main forms of prokaryotes are cocci, rods, convoluted, and filamentous.
6. Stages of preparing smears from bacterial cultures, sputum, blood, and pus.
7. Tinctorial properties and staining methods of microorganisms (simple and complex).
8. Preparing a smear from dental plaque and Burri staining.
9. Structure of a prokaryotic cell. Obligatory and optional structures (inclusions), meaning, and functions.
10. The nuclear apparatus of bacteria, plasmids: their role and structure.
11. Structural features of the cell wall of gram-positive and gram-negative bacteria.
12. The mechanism and stages of Gram staining. What color do cocci, rods, and curved forms stain and why?
13. Protoplasts, spheroplasts, and L-forms: conditions of formation and significance.
14. Acid-fast bacteria. The mechanism and stages of Ziehl-Neelsen staining. What determines the acid-fastness of bacteria?
15. Capsule: structure, significance, and methods of detection. Draw bacteria that form a capsule constantly and exclusively in the body.
16. Spore formation: conditions and stages. Distinguish between different types of spore-forming microbes. Detection of spores, simple and complex staining. Draw microbes that form spores.

17. Flagella in bacteria. Motility and methods of studying them in "crushed" and "hanging" drop preparations. Draw monotrichous, peritrichous, amphitrichous, and lophotrichous bacteria.
18. Pili (fimbriae), types, and significance.
19. Volutin grains: composition, significance, staining according to Loeffler and Neisser. Draw microbes
20. Morphology, structural features, and reproduction of actinomycetes, mycoplasmas, chlamydia, spirochetes, and rickettsia.

COLLOQUIUM #1 ON PHYSIOLOGY, GENERAL VIROLOGY, AND GENETICS OF MICROBES
TEST QUESTIONS

1. The effect of physical and chemical factors on microorganisms. Concepts of sterilization, disinfection, disinfestation, deratization, antisepsis, and asepsis.
2. Sterilization methods (physical, chemical, mechanical, biological): equipment, regimen, and control.
3. Microbial ecology. The role of microbes in the circulation of substances in nature.
4. Microflora of air, water, soil, and the human body.
5. The importance of normal microflora for the human body and the maturation of the immune system.
6. Dysbacteriosis and factors contributing to its development.
7. Principles of microflora correction in dysbacteriosis, eubiotic drugs used to restore normal human microflora in dysbacteriosis.
8. Bacterial nutrition. Mechanisms and classification of bacteria by nutrition type.
9. Nutrient media and classification. Requirements for Nutrient Media.
10. Principle of Preparation of Basic Nutrient Media.
11. Technique for Sowing and Subculturing Microbes.
12. Thermostat and Thermoregulators. Operating Principle.
13. Temperature Limits of Growth: Thermophiles, Psychrophiles, and Mesophiles.
14. Growth and Reproduction of Bacteria. Phases of Bacterial Reproduction on Liquid Nutrient Media. Microbial Colonies, Their Characteristics, and Colony Counting.
15. Microbial Respiration. Classification of Microbes by Respiration Types: Aerobes, Obligate and Facultative Anaerobes, Microaerophiles, and Aerotolerants.
16. Methods for Isolating Pure Aerobic Cultures: Mechanical, Physical, Chemical, and Biological.
17. Methods for Creating Anaerobic Conditions.
18. Bacterial Enzymes. Their Classification. Enzymatic activity of microbes and its use in bacterial identification.
19. Carbohydrate metabolism in bacteria and its importance. Giss, Endo, Levin, Ploskirev, Russell, and other media for bacterial differentiation.
20. Protein metabolism in bacteria, its study and importance for bacterial differentiation.
21. Bacterial pigments, their role, conditions of formation, and classification.
22. Viruses. Classification, structure, and size.
23. Characteristics of virus uniqueness and their differences from bacteria.
24. Types of virus-cell interaction: infection, integration, and virogeny.
25. Types of tissue cultures and their classification. Methods for preparing and culturing cell cultures.
26. Virus cultivation and methods for their detection in chicken embryos and in cell culture.
27. Bacteriophages: virulent, temperate, prophages, and defective. Structure, interaction with bacterial cells, properties, applications, and production.
28. Bacterial genetics. Genotype and phenotype. Types of variability: phenotypic and genotypic. Modifications, dissociations, mutations. Classification of mutations by origin and mechanism.
29. Physical, chemical, and biological mutagens.
30. Genetic recombinations: transformation, transduction, conjugation.
31. Plasmids. Their properties and functions.

32. Mobile genetic elements: transposons, Is sequences, and their role.
33. Concept of genetic engineering and biotechnology.
34. Molecular genetic research method – PCR. Principle of implementation, practical significance.
35. Microbial antagonism.
36. Antibiotics and their sources.
37. Classification of antibiotics by origin, mechanism, and spectrum of action.
38. Principles of rational antibiotic therapy, possible complications, and side effects.
39. Main mechanisms of microbial resistance to antibiotics and preventive measures.
40. Methods for determining bacterial susceptibility to antibiotics.

COLLOQUIUM #2 ON INFECTION, COCCAL, AND AIRBORNE INFECTIONS QUIZ QUESTIONS

1. Concept of infection and the infectious process. Conditions for the onset of the infectious process.
2. Stages of development and characteristic signs of infectious disease.
3. Forms of infection. Concept of bacteremia, toxinemia, sepsis, septicopyemia.
4. Pathogenicity and virulence of bacteria. Pathogenicity factors. Units of measurement of bacterial virulence.
5. Bacterial toxins, their nature, properties, and production.
6. Anatoxins. Production. Purification. Titration. Application.
7. The role of the environment and social factors in the development of the infectious process.
8. Staphylococci. Taxonomy. Characteristics. Sources, routes of infection transmission. Pathogenesis. Microbiological diagnostics of diseases caused by staphylococci. Specific prevention and treatment.
9. Streptococci. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Microbiological diagnosis of streptococcal infections. Treatment and prevention.
10. Pneumococci. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Forms of infection. Microbiological diagnosis. Treatment and prevention.
11. Meningococci. Taxonomy. Characteristics. Forms of infection. Microbiological diagnosis. Treatment and prevention.
12. Gonococci. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Microbiological diagnosis of gonorrhea, ophthalmia. Treatment and prevention.
13. Gardnerella. Morphological and biological properties: Laboratory diagnosis. Treatment and prevention.
14. Chlamydia: their biological properties, cultivation, role in human pathology, principles of laboratory diagnosis of diseases, treatment, prevention.
15. Mycoplasmas: their biological properties, cultivation, role in human pathology, principles of laboratory diagnosis of diseases, treatment, and prevention.
16. Diphtheria pathogens. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Opportunistic corynebacteria. Microbiological diagnosis of diphtheria. Detection of antitoxic immunity. Specific prevention and treatment.
17. Pertussis and parapertussis pathogens. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Microbiological diagnosis. Specific prevention and treatment.
18. Tuberculosis pathogens, classification of mycobacteria. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Microbiological diagnosis of tuberculosis. Specific prevention and treatment. 19. Mycobacterium leprae. Taxonomy. Characteristics. Sources and routes of infection transmission. Pathogenesis. Forms of infection. Microbiological diagnostics. Treatment and prevention.
20. Actinomycetes. Taxonomy. Characteristics. Sources and routes of infection transmission. Pathogenesis. Microbiological diagnostics. Specific prevention and treatment.

4th SEMESTER
TEST #2 ON INTESTINAL INFECTIONS
TEST QUESTIONS

1. Causal agents of coli-infections. Taxonomy. Characteristics. The role of E. coli in health and disease. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnosis of coli-infections. Treatment and prevention.
2. Causal agents of shigellosis. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
3. Causal agents of typhoid and paratyphoid fever. Taxonomy and characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
4. Causal agents of salmonellosis. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnosis of salmonellosis. Treatment and prevention.
5. Causal agents of cholera. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnostics, treatment, and prevention.
6. Pathogens of intestinal yersiniosis. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnostics. Treatment and prevention.
7. Pathogens of proteus infection. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnostics. Treatment and prevention.
8. Pathogens of Klebsiella infection. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnostics. Treatment and prevention.
9. Pseudomonas aeruginosa infection. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnostics. Treatment and prevention.
10. Campylobacter. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnosis of enteritis. Treatment, prevention.
11. Helicobacter pylori. Taxonomy. Characteristics. Sources of infection, routes of transmission, pathogenesis. Microbiological diagnosis of gastric and duodenal ulcers. Treatment, prevention.

COLLOQUIUM No. 3 ON ANAEROBIC, ZOONOTIC, SPIROCHETICAL, AND RICKETTSIAL INFECTIONS
TEST QUESTIONS

1. Anaerobic gas infection agents. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
2. Tetanus agents. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics and treatment.
3. Botulism agents. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
4. Plague agents. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
5. Tularemia agents. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
6. Anthrax pathogens. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
7. Brucellosis pathogens. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
8. Microbiological diagnostics for quarantine infections. Rapid diagnostics.
9. Syphilis pathogens. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics. Treatment and prevention.
10. Epidemic and endemic relapsing fever pathogens, their properties and characteristics. Disease pathogenesis, laboratory diagnostics, specific prevention and treatment. 11. Leptospirosis pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Treatment and prevention.

12. Epidemic and endemic typhus pathogens. Taxonomy. Characteristics and pathogenesis of diseases. Brill-Zinsser disease. Microbiological diagnostics. Specific prevention and treatment.
13. Q fever pathogen. Taxonomy. Characteristics. Sources of infection transmission, disease pathogenesis. Microbiological diagnostics, prevention, and treatment.

COLLOQUIUM #4 ON VIRAL INFECTIONS
QUIZ QUESTIONS

1. The significance of D.I. Ivanovsky's discovery of viruses. Stages in the development of virology. The role of Russian scientists in the development of virology.
2. Pathogens of acute respiratory viral infections. Taxonomy. Characteristics. Sources and routes of infection.
3. Influenza viruses. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease, clinical manifestations. Microbiological diagnostics. Specific prevention and treatment.
4. Parainfluenza viruses. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease, clinical manifestations. Microbiological diagnostics. Specific prevention and treatment.
5. Measles virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease, clinical manifestations. Microbiological diagnostics. Specific prevention and treatment.
6. Mumps virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis, clinical manifestations. Microbiological diagnostics. Specific prevention and treatment.
7. Respiratory syncytial virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis, clinical manifestations. Microbiological diagnostics, treatment, and prevention.
8. Adenoviruses. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis, clinical manifestations. Microbiological diagnostics, treatment, and prevention.
9. Coronaviruses. SARS-Severe Acute Respiratory Syndrome (SARS) virus. Taxonomy. Characteristics. Sources and routes of infection. Microbiological diagnostics. Specific prevention and treatment.
10. Enteroviruses: Coxsackie and ECHO. Taxonomy. Characteristics. Sources and routes of infection. Disease pathogenesis, clinical manifestations. Microbiological diagnostics. Specific prevention and treatment.
11. Polioviruses. Taxonomy. Characteristics. Sources and routes of infection. Disease pathogenesis, clinical manifestations. Microbiological diagnostics. Specific prevention and treatment.
12. Hepatitis viruses A, B, C, D, and E. Taxonomy. Characteristics. Sources and routes of infection. Disease pathogenesis, main clinical manifestations. Microbiological diagnostics. Specific prevention and treatment.
13. Arboviruses. Taxonomy. Characteristics. Sources and routes of infection. Disease pathogenesis. General principles of microbiological diagnostics of arboviral infections. Fundamentals of specific prevention and treatment.
14. Yellow fever viruses. Taxonomy. Characteristics. Sources and routes of infection. Disease pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
15. Mosquito-biting fever virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention and treatment.
16. Dengue fever virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention and treatment.
17. Tick-borne and Japanese encephalitis viruses. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention and treatment.
18. Omsk hemorrhagic fever virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention and treatment.
19. Crimean hemorrhagic fever virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention and treatment.

20. Hemorrhagic fever with renal syndrome virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention and treatment.
21. Rabies virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention.
22. Smallpox virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis of the disease. Microbiological diagnostics. Specific prevention of smallpox in the present stage.
23. Rubella virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
24. Herpesvirus infection – herpes simplex virus 1, 2: taxonomy, characteristics of pathogens. Sources and routes of infection. Pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
25. Varicella-zoster virus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
26. Cytomegalovirus. Taxonomy. Characteristics. Sources and routes of infection. Pathogenesis. Microbiological diagnostics. Specific prevention and treatment..
27. Epstein-Barr virus. Taxonomy. Characteristics of the pathogen. Sources and routes of infection transmission. Disease pathogenesis. Disease pathogenesis, main clinical manifestations. Microbiological diagnostics. Prevention and treatment.
28. HIV infection. Taxonomy and characteristics of the pathogen. Sources and routes of infection transmission. Disease pathogenesis, clinical manifestations. Microbiological diagnostics and prevention.
29. Classification and characteristics of oncogenic RNA and DNA viruses. Mechanism of oncogenesis.
30. Slow infection viruses. Characteristics of the pathogen. Mechanism of development and manifestations. Principles of laboratory diagnostics.
31. Prion diseases. Etiology, pathogenesis, manifestations. Principles of treatment and prevention.

EXAM QUESTIONS IN MICROBIOLOGY AND VIROLOGY
GENERAL PART

1. L. Pasteur – the founder of microbiology as a science. The influence of Pasteur's work on the development of medical microbiology and the formation of applied immunology. The significance of R. Koch's work in practical microbiology and infectious pathology.
2. The contributions of I.I. Mechnikov, P. Ehrlich, J. Bordet, and F. Burnet in the study of the body's immunity to infectious diseases and in the development of immunology.

Morphology of microorganisms.

1. Basic principles of microbial classification.
2. Morphological and tinctorial properties of bacteria. Simple and complex staining methods.
3. Structure and chemical composition of bacterial cells. Structural features of gram-positive and gram-negative bacteria.
4. Morphology of fungi. Classification principles.
5. Morphology of protozoa. Classification principles.
6. Features of viral biology.
7. Principles of virus classification.
8. Structure and chemical composition of viruses and bacteriophages.
9. Prions and viroids: origin and function.
10. Microscopy methods (fluorescence, darkfield, phase contrast, electron).

Physiology of microorganisms.

1. Bacterial growth and reproduction. Reproduction phases.
2. Bacterial energy production methods (respiration, fermentation).

3. Bacterial nutrition types and mechanisms.
4. Basic principles of bacterial cultivation.
5. Artificial nutrient media and their classification. Requirements for nutrient media.
6. Principles and methods for isolating pure cultures of aerobic and anaerobic bacteria.
7. Bacterial enzymes. Bacterial identification by enzymatic activity.
8. Intraspecific identification of bacteria (epidemic marking).
9. Normal microflora of the body and its functions. Dysbiosis. Eubiotics.
10. The effect of physical and chemical factors on microorganisms. Concepts of sterilization, disinfection, asepsis, and antisepsis.
11. Sterilization methods and equipment.
12. Concept of chemotherapy and chemotherapeutic drugs. Mechanism of action of sulfonamides and quinolones.
13. Antibiotics: classification by source and method of production.
14. Antibiotics: classification by chemical structure, mechanism, and spectrum of action.
15. Complications of antibiotic therapy and their prevention.
16. Mechanisms of drug resistance in infectious agents. Ways to overcome drug resistance.
17. Methods for determining bacterial susceptibility to antibiotics.
18. Viral morphology.
19. Viral cultivation methods.
20. Cell culture.
21. Types of virus-cell interaction. Phases of viral reproduction.
22. Bacteriophages. Phage-bacterial cell interaction. Temperate and virulent bacteriophages. Lysogeny. Defective phages.
23. Application of phages in medicine and biotechnology.
24. Bacterial genetics.
25. Structure of the bacterial genome. Concepts of genotype and phenotype. Types of variability.
26. Plasmids, transposons, and Is sequences in bacteria, their functions and properties, and use in genetic engineering.
27. Mechanisms of genetic material transfer in bacteria. Modifications, mutations, dissociations, and genetic recombinations.
28. Polymerase chain reaction. Essence. Components. Application.

Infection and anti-infective immunity

1. Concept of infection. Conditions for the onset of an infectious process.
2. Stages of development and characteristic features of infectious disease.
3. Pathogenicity and virulence of bacteria. Pathogenicity factors.
4. Bacterial toxins, their nature, properties, and production.
5. Anatoxins. Production. Purification. Titration. Application.
6. The immune system and its importance.
7. Immunity: innate, acquired, active, passive, infectious, non-infectious, sterile, non-sterile.
8. Which organs of the immune system are classified as central and peripheral? Their functions?
9. Name the main populations and subpopulations of cells in the immune system. What are their main functions and markers?
10. The mechanism of intercellular cooperation in the implementation of the primary immune response.
11. Features of immunity in bacterial, viral infections, and oncological diseases.
12. Agglutination reaction. Reaction ingredients: antigens, antibodies, and their characteristics. Reaction methods.
13. What are diagnosticums, and what are they used for?
14. How is diagnostic immune serum produced, and what is it used for?
15. Precipitation reaction. Technique. Practical application.
16. Toxin neutralization reaction with antitoxic serum (flocculation phenomenon). Production of antitoxic sera. Practical application – diagnostic, therapeutic.

17. Immobilization reaction.
18. Direct and indirect immunofluorescence reaction.
19. Concept of hybridomas and monoclonal antibodies.
20. Mechanism of radioimmunoassay.
21. Immunoblotting. Mechanism and technique, purpose of use.
22. Complement fixation reaction, systems involved in the reaction, components, and the complement fixation reaction mechanism. Concept of specific and nonspecific antigens. Practical significance of the complement fixation reaction.
23. Enzyme-linked immunosorbent assay (ELISA), mechanism and technique, purpose of use.
24. Concept of allergy. Types of allergic reactions, forms of their manifestation.
25. Immediate-type hypersensitivity (ITH): humoral mechanism of development, factors, types.
26. Anaphylaxis, mechanism of development.
27. Desensitization. Bezredko's method.
28. Serum sickness, manifestations, mechanism of development, prevention.
29. Delayed-type hypersensitivity (DTH): mechanism of development, factors, types (infectious). 30. Methods for detecting infectious allergies in vivo - allergy tests and in vitro - lymphocyte blast transformation reaction (LBTR), leukocyte migration inhibition reaction (LMIR)
31. What are vaccines? What are the requirements for vaccine preparations?
32. Classification of vaccines, brief characteristics of each type.
33. What is an attenuated strain, what requirements must it meet, how does it interact with the macroorganism?
34. What is the BCG vaccine? How is the live influenza vaccine obtained?
35. In what cases are vaccines used for immunotherapy? Give examples of such vaccines. What are autovaccines?
36. Infectious allergens, the principle of their use in the diagnosis of infectious diseases.

SPECIAL PART.

1. Taxonomy of the pathogen: for bacteria – division, family, genus, species; for eukaryotes – classes, species; for viruses – DNA or RNA genomic viruses, family, genus, species, serogroup.
2. Characteristics of the pathogen: morphological, tinctorial, cultural, biochemical, genetic, and antigenic properties, pathogenicity factors, resistance to various factors; biological models.
3. Diseases caused – brief epidemiological characteristics (sources of infection, mechanism, routes and factors of transmission, susceptible population), pathogenesis, main clinical manifestations, and immune system characteristics.
4. Microbiological diagnostics: test material, diagnostic methods used.
5. Specific prophylaxis and etiotropic treatment (vaccines, serums, phages, chemotherapy).

PRIVATE MICROBIOLOGY

1. Methods of Microbiological Diagnosis of Infectious Diseases.
2. Staphylococci. Taxonomy. Characteristics. Microbiological Diagnosis of Diseases Caused by Staphylococci. Specific Prevention and Treatment.
3. Streptococci (Pyogenic and Pneumococci). Taxonomy. Characteristics. Microbiological Diagnosis of Streptococcal Infections. Treatment.
4. Meningococci. Taxonomy. Characteristics. Forms of Infection. Microbiological Diagnosis. Treatment.
5. Gonococci. Taxonomy. Characteristics. Microbiological Diagnosis of Gonorrhea. Treatment.
6. Chlamydia. Taxonomy. Characteristics. Forms of Infection. Microbiological Diagnosis. Treatment and Prevention.

7. Mycoplasmas. Taxonomy. Characteristics. Forms of Infection. Microbiological Diagnosis. Treatment and prevention.
8. Gardnerella. Taxonomy. Characteristics. Microbiological diagnostics. Treatment and prevention.
9. Diphtheria pathogens. Taxonomy. Characteristics. Opportunistic corynebacteria. Microbiological diagnostics. Detection of antitoxic immunity. Specific prevention and treatment.
10. Whooping cough and parapertussis pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
11. Tuberculosis pathogens. Taxonomy. Characteristics. Opportunistic mycobacteria. Microbiological diagnostics of tuberculosis. Specific prevention and treatment.
12. Leprosy pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
13. Actinomycetes. Taxonomy. Characteristics. Microbiological diagnostics. Treatment and prevention.
14. Causal agents of coli infections. Taxonomy and characteristics. The role of E. coli in health and disease. Microbiological diagnostics of coli infections. Treatment and prevention.
15. Causal agents of typhoid and paratyphoid fever. Taxonomy and characteristics. Microbiological diagnostics. Specific prevention and treatment.
16. Causal agents of salmonellosis (food poisoning, gastroenteritis). Taxonomy and characteristics. Microbiological diagnostics. Treatment and prevention.
17. Causal agents of shigellosis (dysentery). Taxonomy and characteristics. Microbiological diagnostics. Specific prevention and treatment.
18. Causal agents of cholera. Taxonomy and characteristics. Microbiological diagnostics. Specific prevention and treatment.
19. Causal agents of intestinal yersiniosis. Taxonomy and characteristics. Microbiological diagnostics. Treatment.
20. Causal agents of campylo- and helicobacter infections. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
21. Causal agents of tularemia. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
22. Causal agents of anthrax. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
23. Causal agents of brucellosis. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
24. Plague pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
25. Microbiological diagnosis of quarantine infections. Rapid diagnostics.
26. Anaerobic gas infection pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
27. Botulism pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Specific prevention and treatment.
28. Tetanus pathogens. Taxonomy. Characteristics. Microbiological diagnostics, treatment, and prevention.
29. Typhus pathogens. Taxonomy. Characteristics. Brill-Zinsser disease. Microbiological diagnostics. Specific prevention and treatment.
30. Q fever pathogens. Taxonomy. Characteristics. Microbiological diagnostics, prevention, and treatment.
31. Syphilis pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
32. Leptospirosis pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
33. Epidemic and endemic relapsing fever pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
34. The role of opportunistic microorganisms – Proteus and Klebsiella – in the development of nosocomial infections. Clinical microbiology and its objectives.

35. Pseudomonas aeruginosa. Taxonomy. Characteristics. Microbiological diagnostics and treatment.
36. Fungi classification. Characteristics. Superficial and deep mycoses. Role in human pathology. Laboratory diagnostics. Treatment and prevention of mycoses of various localizations.
37. Yeast-like fungi Candida. Taxonomy. Characteristics. Pathogenesis of the disease. Microbiological diagnostics. Treatment and prevention.
38. Malaria pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
39. Toxoplasmosis pathogen. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.Возбудители лейшманиозов. Таксономия. Характеристика. Микробиологическая диагностика. Лечение.
40. Trypanosomiasis pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
41. Amebic dysentery pathogen. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
42. Balantidiasis pathogen. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
43. Giardiasis and trichomoniasis pathogens. Taxonomy. Characteristics. Microbiological diagnostics. Treatment.
44. The significance of D.I. Ivanovsky's discovery of viruses. Stages in the development of virology. The role of Russian scientists in the development of virology.
45. Acute respiratory viral infection pathogens. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
46. Influenza viruses. Taxonomy. Characteristics.
47. Parainfluenza viruses. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
48. Measles virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention.
49. Mumps virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
50. Respiratory syncytial virus. Taxonomy, characteristics. Disease pathogenesis, laboratory diagnostics, treatment, and prevention.
51. Adenoviruses. Taxonomy, characteristics. Disease pathogenesis, laboratory diagnostics, treatment, and prevention.
52. Coronaviruses. SARS virus – severe acute respiratory syndrome (SARS). Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
53. Enteroviruses Coxsackie, ECHO. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
54. Polioviruses. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention.
55. Hepatitis viruses A, B, C, D, E. Taxonomy. Characteristics. Pathogenesis of diseases, main clinical manifestations. Laboratory diagnostics. Specific prevention.
56. Arboviruses. Taxonomy. Characteristics. Laboratory diagnostics of diseases caused by arboviruses. Specific prevention and treatment.
57. Yellow fever viruses. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
58. Mosquito fever virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
59. Dengue fever virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
60. Tick-borne and Japanese encephalitis viruses. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention.
61. Omsk hemorrhagic fever virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
62. Crimean hemorrhagic fever virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.

63. Hemorrhagic fever with renal syndrome virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
64. Rabies virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention.
65. Smallpox virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention of smallpox in the present era.
66. Rubella virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention.
67. Herpesvirus infection – herpes simplex virus 1, 2: taxonomy, characteristics of pathogens. Laboratory diagnostics. Specific prevention and treatment.
68. Chickenpox and herpes zoster virus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
69. Cytomegalovirus. Taxonomy. Characteristics. Laboratory diagnostics. Specific prevention and treatment.
70. Epstein-Barr virus. Taxonomy. Characteristics of pathogens. Pathogenesis of diseases, main clinical manifestations. Laboratory diagnostics. Prevention and treatment.
71. HIV infection. Taxonomy and characteristics of pathogens. Laboratory diagnostics and prevention.
72. Classification and characteristics of oncogenic RNA and DNA viruses. Mechanism of oncogenesis.
73. Slow-acting viruses. Characteristics of pathogens. Mechanism of development and manifestations. Principles of laboratory diagnostics.
74. Prion diseases. Etiology, pathogenesis, manifestations.

4. METHODOLOGICAL MATERIALS DETERMINING THE PROCEDURES FOR ASSESSING KNOWLEDGE, ABILITIES, SKILLS AND (OR) WORK EXPERIENCE, CHARACTERIZING THE STAGES OF FORMATION OF COMPETENCIES DESCRIPTION OF INDICATORS AND CRITERIA FOR ASSESSING COMPETENCIES, DESCRIPTION OF ASSESSMENT SCALES

Recommendations for organizing student independent work

1. Tips for planning and organizing the time needed for studying the course. It is recommended to organize the time needed for studying the course as follows:
Study lecture notes on the same day, after the lecture – 10-15 minutes.
Study lecture notes the day before the next lecture – 10-15 minutes.
Study theoretical material from the textbook and notes – 1 hour per week.
Prepare for the practical lesson – 2 hours.
Total per week – 3 hours 30 minutes.
2. Description of the student's sequence of actions
To understand the material and assimilate it effectively, the following sequence of actions is recommended:
1. After listening to the lecture and finishing the classes, in preparation for the next day's classes, you should first review and reflect on the lecture text you listened to today (10-15 minutes).
2. When preparing for the next day's lecture, review the previous lecture and think about the potential topic of the next lecture (10-15 minutes).
3. During the week, set aside time (1 hour) to work with recommended library readings.
4. When preparing for the next day's practical classes, first review the key concepts and approaches to the homework topic. When completing an exercise or problem, first understand the task's requirements, what theoretical material to use, and outline a solution plan.
3. Recommendations for using educational and methodological materials. It is recommended to use the course guidelines (Appendix No. __) and the instructor's lecture notes.
4. Recommendations for working with literature. The theoretical material of the course becomes more understandable when, in addition to listening to lectures and studying notes, you also study books. It is easier to master the course by using only one textbook and notes. It is

recommended, in addition to memorizing the material, to achieve a level of understanding of the topic being studied. To this end, it is recommended that after studying each section, you complete several simple exercises on the topic. It is also very helpful to mentally ask yourself the following questions (and try to answer them): What is this section about? What new concepts are introduced, what is their meaning? What practical implications will this have?

5. Tips for preparing for final and midterm assessments. In addition to studying lecture notes, you should use the textbook. In addition to memorizing the material, it is crucial to develop a clear understanding of the topics being studied. To this end, it is recommended that after studying each section, you complete several exercises on the topic. It is also very helpful to mentally ask yourself the following questions (and try to answer them): What is this section about? What new concepts are introduced, what is their meaning? What practical implications will this have?

In preparation for the midterm assessment, you should study the theory: definitions of all concepts and assessment approaches to a level of understanding of the material, and independently solve several typical problems from each topic. When solving problems, it is always important to be able to accurately interpret the results of the solution.

6. Instructions for organizing work with test materials and completing homework assignments. When completing homework, you must first read the basic concepts and approaches to the assignment topic. When solving an exercise or problem, you must first understand what the problem requires, what theoretical material to use, outline a solution plan, and then begin calculations and draw a quality conclusion.

7. The structure of the coursework should include:

title page (Appendix No. _);
table of contents (Appendix No. _);
introduction;
main body;
conclusion;
bibliography;
appendices.

The introduction indicates the relevance and significance of the topic, its level of development in the literature, including defining existing approaches to the problem in science and practice, formulating the purpose and objectives of the work, describing the practical materials used by the author, and the structure of the work.

The main body of the work may contain several chapters that present the theoretical aspects of the topic based on an analysis of published literature, address controversial issues, and formulate the author's position and point of view (the theoretical part); describe the student's observations and experiments, research methodology, calculations, analysis of experimental data (collected factual material), and the results obtained (the practical part). The content of the theoretical and practical sections is determined depending on the specialty profile and the topic of the work.

Chapters should have headings that reflect their content. However, chapter headings should not repeat the title of the work. The conclusion summarizes the work, formulates the author's key findings, and provides recommendations for the practical application of the research results.

The list of references includes: regulatory and legal acts;
scientific and technical literature and periodicals;
practical materials.

The list of references includes sources studied by the student during the preparation of the work, including those referenced.

The list of references is compiled in accordance with bibliographic formatting guidelines.

Appendices to the work may include illustrations, graphs, tables, diagrams, questionnaires, photographs, analytical reports, etc.

The text portion of the work is submitted in a computer version (printed). The text is typed double-spaced on one side of a standard sheet of white, single-page paper (A4).

Pages should have the following margins: left 30 mm, right 10 mm, top 20 mm, bottom 20 mm.

All pages of the work (project), including illustrations and appendices, are numbered sequentially

from the title page to the last page. The title page is considered the first page. No page number is included on it; the number "2" appears on the next page, and so on. The page number is placed at the bottom right of the page.
The work should be approximately 20-40 typewritten pages, not including appendices. Works containing restricted information are formatted in accordance with the requirements of the secrecy regime.
Drawings must comply with the Unified System for Design Documentation (ESKD) in terms of format, symbols, fonts, and scale, while diagrams must comply with the relevant GOST standards.
When using quotations or provisions borrowed from literature in the text of the work, the student is required to cite them in accordance with established rules. Borrowing text without citing the source (plagiarism) is not permitted.
Practical materials from internal affairs agencies used by the student in the work must be certified by the signature of the head of the relevant internal affairs agency. The completed work is submitted to the supervisor for review. Based on the review results, the supervisor issues a decision on whether the coursework is acceptable for defense.
Any work deemed not to meet the requirements is returned to the student for revision, with any deficiencies noted and recommendations for addressing them provided.
The deadline for revision is determined in consultation with the department head and faculty leadership.

8. Preparing a Report for Class

An oral presentation should not be a retelling of someone else's thoughts, but rather an attempt to independently problematize and conceptualize a specific, fairly narrow, and concrete topic. All footnotes in the work are carefully verified and provided with "addresses." It is unacceptable to include excerpts from other authors' works without acknowledging them, to paraphrase someone else's work closely without citing it, or to use someone else's ideas without citing the original source. This also applies to sources found on the internet. The full website address must be provided. All instances of plagiarism must be excluded. A comprehensive list of all references is provided at the end of the work.
Preparing a Report for Class

Key Stages of Report Preparation:

• Selecting a Topic;
• Consulting with the Instructor;
• Preparing a Report Outline;
• Working with Sources and Literature, Gathering Material;
• Writing the Report;
• Completing the manuscript and submitting it to the instructor before the presentation, which determines the student's readiness to deliver;
• Delivering the presentation and answering questions.

The instructor will suggest the topic of the presentation to the Faculty of Social Sciences.

9. Recommendations for Writing an Abstract

1. The topic of the abstract is chosen based on your interests and does not necessarily correspond to the sample list below. It is important that the abstract: firstly, cover both the natural scientific and social aspects of the problem; secondly, present both general theoretical principles and specific examples. The use of personal examples from your own life is especially encouraged.
2. The abstract should be based on several sources additional to the main literature. Typically, these are specialized monographs or articles. Many regions regularly publish Environmental Reports. It is also recommended to use popular science magazines as supplementary literature: "Nature," "Science and Life," "Chemistry and Life," "Energy," and others, as well as newspapers specializing in environmental topics.
3. The outline of the paper should be original. It should reflect the author's approach, opinion, and analysis of the problem.

4. All facts and borrowed ideas cited in the paper should be accompanied by references to the source. For example: ... We were interested in the recent decline in the birth rate in Russia (Population of Russia, 2008)... or ... It has been established that in large cities such as Moscow, air pollution levels at certain times can exceed maximum permissible concentrations by 10 or more times (Likhacheva, Smirnova, 2006)...

5. It is unacceptable to simply cobble together a paper from pieces of borrowed text. All citations must be presented in quotation marks, with the source and page number indicated in parentheses. For example: "Having analyzed human history over 2,400 years, A.L. Chizhevsky established a connection between the cycles of historical events and solar activity, with these cycles being equal to an average of 11 years." (Lupachev, 1995, p. 39). The absence of quotation marks and references constitutes plagiarism and, in accordance with established scientific ethics, is considered a gross copyright violation.
6. The abstract is formatted as text on standard-size sheets (A4). It begins with a title page, which indicates the name of the university, the academic discipline, the topic of the abstract, the student's last name and initials, the academic group number or department name, and the year and geographic location of the university. This is followed by a table of contents indicating the page numbers of the sections. It is advisable to divide the text of the abstract into sections: chapters, subchapters, and titles. The use of quantitative data and illustrations (graphs, tables, diagrams, and figures) in the abstract is encouraged.
7. The abstract concludes with the "Conclusion" and "References" sections. The conclusion presents the main findings, clearly stated in thesis form and usually numbered.
8. The bibliography must be compiled in full compliance with the current standard (rules), including special punctuation. For this purpose, it is sufficient to use as an example any book published by major scientific publishers: "Nauka," "Progress," "Mir," "MSU Publishing House," etc., or the bibliography provided above. In general, the most commonly used order of bibliographic references in our country is as follows:

Author I.O. Book Title. Place of Publication: Publisher, Year of Publication. Total Number of Pages in the Book.
Author I.O. Article Title // Journal Title. Year of Publication. Volume __. No. __. Pages __ to ___.
Author I.O. Article Title / Collection Title. Place of Publication: Publisher, Year of Publication. Pages __ to ___.

10. Colloquium Preparation and Defense (Oral)

When conducting a colloquium on the topics of the course, survey questions from the FOS list are proposed.
Colloquium Objectives:
The colloquium sets the following objectives:
• Testing and monitoring acquired knowledge on the topic or section being studied;
• Expanding the scope of the topic through additional questions on the topic or section;
• Deepening knowledge through the use of additional materials in preparation for the lesson;
Students must demonstrate their ability to work with various types of sources (geological maps, specialized albums, atlases, mineral resource maps of the Kyrgyz Republic and the Russian Federation, geochronological tables, genetic classification of minerals, schematic geological sections, rock classifications, classification of mineral deposits by reserves, etc.).
A student can consider themselves ready to take a colloquium on their chosen work when they have personally compiled and reviewed a summary of the work to be submitted, are familiar with the overall structure of the work, the content of the work as a whole, or its individual sections, are able to address the issues under consideration, express their attitudes toward what they have read, and their doubts, and know how to convince the instructor of the correctness of their judgment.
Stages of the colloquium:
1. Students independently prepare for questions (homework).
2. Beginning of the lesson:

• Students are divided into small groups of 5-7 people and seated accordingly to ensure comfortable collaboration;
• A representative of a small group draws a question on a given topic or section for discussion in their small group.
3. Question-and-answer period:
• Students are given 10 minutes to consider and discuss the question, after which one of the students in the small group provides an answer;
• Students from other microgroups ask questions of the respondent, comment, and expand on the proposed answer;
• The instructor moderates the discussion by asking leading questions and correcting incorrect or incomplete answers;
• The instructor makes a note next to the microgroup number (true/false, complete/incomplete, reasoned/unreasoned) and asks the next question.
Summary.
• At the final stage, the results for each microgroup are summarized;
• A description of the work of each microgroup and the answers of each student is given;
• The most competent and correct student answers are highlighted and graded.
If a student taking a colloquium in a group does not answer a question, the instructor can address it to other students taking the colloquium on the same paper. In this case, the entire group of students will work actively and thoughtfully during the interview. Each student will carefully monitor the answers of their colleagues and strive to supplement them, i.e., Actively participate in the discussion of this primary source.

11. Recommendations for Presentation Preparation and Defense

Multimedia presentations are a type of independent student work designed to create visual information aids using the PowerPoint multimedia software. This type of work requires students to coordinate their skills in collecting, organizing, and processing information, and presenting it in electronic format as a collection of materials that briefly reflect the main issues of the topic being studied. In other words, creating presentation materials expands the methods and means of processing and presenting educational information and develops students' computer skills.
Presentation materials are prepared by students in the form of slides using Microsoft PowerPoint. Students are required to prepare a presentation and present it in class as a report.
1. The student selects the presentation topic from the suggested list of FOS and must be agreed upon with the instructor and correspond to the lesson topic.
2. Stages of Presentation Preparation
Preparing a presentation plan (setting the task; goals of the work)
Thinking through each slide (at first, this can be done by hand on paper), it is important to answer the following questions:
- How does the idea of this slide convey the main idea of the entire presentation?
- What will be on the slide?
- What will be said?
- How will the transition to the next slide be made?
3. Creating a presentation using MS PowerPoint:
- It makes sense to be neat. Sloppily prepared slides (inconsistencies in fonts and indents, typos, typographical errors in formulas) raise suspicions that the student presenter has taken a careless approach to the substantive issues.
- A title page is necessary to introduce you and the topic of your presentation to the audience.
- No more than 30 slides.
- The optimal number of lines per slide is 6 to 11.
- A common mistake is reading a slide verbatim. It's best to write detailed information (definitions, formulas) on the slide, and explain their meaning verbatim. Information on a slide can be more formal and clearly presented than spoken word.
- The optimal switching speed is one slide every 1–2 minutes.

- It's encouraged to use more drawings, pictures, formulas, graphs, and tables in the presentation. Animation effects are also acceptable.
- When explaining tables, explain what rows correspond to and what columns correspond to.
- Introduce only those symbols and concepts that are essential for understanding the main ideas of the presentation.
- In a short presentation, don't repeat the same idea over and over again, even in different words—time is precious.
- Every phrase should have a purpose. Then the presentation will be coherent and leave a good impression.
- The final slide with conclusions in short presentations should not be read aloud.
- If the slide contains a lot of formulas, it is recommended to type it entirely in MS Word (otherwise, you will have to place and align the formulas manually). For this purpose, it is convenient to create a blank slide with one large Word object (Insert / Object / Microsoft Word Document). Adjust its dimensions once and replicate it across the required number of slides. It is recommended to change the primary font in the text and formulas to Arial or a similar font; Times font looks bad from a distance. Be sure to set the primary font size in MathType to the same as the primary font size in the text. Never manually adjust the size of a formula by dragging it by the corner.

4. The student is obliged to prepare and deliver the presentation within the time allotted by the instructor and on time.

5. Instructions for presenters.
- communicate new information;
- use technical equipment;
- be familiar with and well-versed in the topic of the entire presentation;
- be able to discuss and quickly answer questions;
- strictly adhere to the established time limit: speaker - 10 minutes; discussion - 5 minutes;

It's important to remember that a presentation consists of three parts: introduction, main body, and conclusion.

The introduction helps ensure the success of a presentation on any topic. The introduction should include:
- the title of the presentation;
- a statement of the main idea;
- a current assessment of the subject matter;
- a brief summary of the issues discussed;
- a lively, engaging presentation;

The main body, in which the speaker should thoroughly explore the essence of the topic, is usually structured like a report. The goal of the main body is to present sufficient data to engage the audience and motivate them to read the material. The logical structure of the theoretical section should not be presented without visual aids, audiovisual, and visual materials.

The conclusion is a clear, concise summary and conclusions that the audience always expects.

12. Recommendations for Writing an Essay

An essay is written by undergraduate students in the classroom and requires an independent, creative response to one of the questions. The topic should address a specific problem and cover a short period of time. The answer should be an analysis of the problem. The work should not be abstract or descriptive in nature. A significant portion of the essay should be devoted to a reasoned presentation of one's point of view and a critical assessment of the material and issues under consideration, which should highlight their creative abilities.

Essay Requirements

1. The essay should not exceed 1-2 pages.
2. The essay should be perceived as a coherent whole, with a clear and understandable idea.
3. It is essential to write concisely and clearly. The essay should not contain anything superfluous; it should include only the information necessary to express your position and idea.
4. The essay should be well-structured, logical, and clearly structured.

5. Each paragraph of the essay should contain only one main idea.
6. The essay should demonstrate that the author understands and meaningfully uses theoretical concepts, terms, generalizations, and ideological ideas.
7. The essay should contain convincing arguments for the stated position on the problem.

Essay Structure

The essay structure is determined by the requirements placed on it:

• the author's thoughts on the problem are presented in the form of brief theses (T);
• the idea must be supported by evidence - therefore, the thesis is followed by arguments (A).

A thesis is a proposition that must be substantiated.

Arguments include facts, social phenomena, events, life situations and experiences, scientific evidence, references to the opinions of scientists, etc. It is best to provide two arguments in support of each thesis: one argument seems unconvincing, while three arguments can "overload" a presentation written in a genre focused on brevity and imagery. Thus, the essay takes on a circular structure (the number of theses and arguments
depends on the topic, the chosen plan, and the logic of thought development):

• introduction
• thesis, arguments
• thesis, arguments
• thesis, arguments
• conclusion.

Let's consider each of the essay's components.

The introduction is the essence and justification for the chosen topic. At this stage, it is crucial to correctly formulate the question you intend to answer. In the introduction, you can write a general statement of the argument or an interpretation of the main term of the topic, or use a paraphrase (the main idea of the statement), for example: "for
me, this phrase is the key to understanding...", "this short statement opens up amazing scope for thought..."

The main body is the answer to the question posed. One paragraph contains: thesis, evidence, illustrations, and a subconclusion, which partially answers the question posed. In the main body, you should present your own point of view and substantiate it. To advance arguments in the main body of the essay, you can use the so-called
POPS formula:

P – Proposition (Statement) – I believe that...
O – Explanation – Because...
E – Example, Illustration – For example,...
C – Judgment (Final) – Thus,...

Express your opinion, reason, analyze, and do not substitute
evaluation with a retelling of theoretical sources. The conclusion summarizes the main ideas of the main part, leading to the proposed answer to the question or stated point of view, and draws conclusions.

Methodological guidelines for completing some analytical tasks

1. Compiling a two-part and three-part diary.

A "double/triple diary" is completed as follows: the page is divided in half by a vertical line. The first column contains text fragments (quotes, key events, main points, central concepts, etc.), and the second column contains personal reflections on them (understanding, interpretation, subjective attitude, associations, etc.).

It is important to capture the following fundamental idea: the first column always contains text fragments, while the second column contains the writer's own thoughts and their substantive attitude toward a given fragment. Essentially, a "double diary" is a form of dialogue between the author and the reader.

2. Schematic representation of the task as a cluster

A cluster is a graphical form of information organization in which the main semantic units are identified and recorded in a diagram, with all the connections between them indicated. It is an image that facilitates the systematization and generalization of educational material. Basic principles for creating a cluster

A cluster is designed as a cluster or a model of a planet with satellites. The main concept or idea is placed in the center, with larger semantic units on the sides, connected to the central concept by straight lines. These can be words, phrases, or sentences expressing ideas, thoughts, facts, images, or associations related to the topic. Smaller semantic units can be placed around the "satellites" of the central planet, more fully developing the topic and expanding the logical connections. It is important to be able to concretize the categories, substantiating them with opinions and facts contained in the material being studied.

Cluster Design Rules

A cluster can be designed on a sheet of A1 Whatman paper or in each student's notebook for individual assignments. When creating a cluster, it is advisable to use different colored pencils, pens, and markers. This will allow you to highlight specific points and more clearly depict the overall picture, simplifying the process of organizing all the information.

Cluster Design Recommendations

There are several recommendations for creating a cluster. When creating it, don't be afraid to express and record everything that comes to mind, even if they are just associations or assumptions. As you work, incorrect or inaccurate statements can be corrected or supplemented. Students can confidently give free rein to their imagination and intuition, continuing to work until all ideas are exhausted. Don't be afraid of a large number of semantic units; try to create as many connections between them as possible. During the analysis, everything will be systematized and fall into place.

TYPES OF ASSIGNMENT RATING SCALES

1. Template for comprehensive assessment schemes

85-100% - Demonstrates a complete understanding of the problem. All assignment requirements are met.

70-84% - Demonstrates a significant understanding of the problem. All assignment requirements are met.

60-69% - Demonstrates a partial understanding of the problem. Most assignment requirements are met.

31-60% - Demonstrates some understanding of the problem. Many assignment requirements are not met.

0-30% - Demonstrates a lack of understanding of the problem or no answer, and no attempt was made to solve the problem.

2. Colloquium Grading Scale

"85-100%"

• Deep and thorough understanding of the topic or section material;

• Complete, consistent, competent, and logically presented answers;

• Demonstration by the student of knowledge within the scope of the completed syllabus and additional recommended literature;

• Reproduction of the educational material with the required degree of accuracy.

"75-84%"

• Minor errors confidently corrected by the student after additional and leading questions;

• Demonstration by the student of knowledge within the scope of the completed syllabus;

• Clear presentation of the educational material.

"60-74%"

• Minor errors in the answer not corrected by the student;

• Demonstration by the student of insufficient knowledge of the completed syllabus;

• unstructured, incoherent presentation of the course material in the answer.
"Less than 60%"
• Lack of knowledge of the topic or section;
• Serious errors in the answer.
Assessment Criteria for the Interim Assessment (Credit) in the Discipline

3. Oral Questionnaire Assessment Scale

The following criteria are taken into account when assessing oral responses to the KNOW proficiency test:
1. Knowledge of the fundamental processes in the subject area being studied, depth and completeness of the question.
2. Mastery of terminology and its use in answering.
3. Ability to explain the essence of phenomena, events, and processes, draw conclusions and generalizations, and provide reasoned answers.
4. Proficiency in monologue speech, logical and consistent responses, the ability to answer questions, and express opinions on the issue under discussion.
A mark (16-20 points) is awarded for an answer that demonstrates a solid knowledge of the main natural and man-made hazards. The student expertly discusses the impact of harmful and hazardous factors on humans and the environment, as well as methods and means of protecting against them. Deep knowledge of the theoretical foundations of life safety in emergency situations, as well as the legal, regulatory, technical, and organizational foundations of life safety.
Excellent understanding of the anatomical and physiological consequences of human exposure to traumatic, harmful, and damaging factors, as well as first aid techniques.
A mark (10-15 points) is awarded for an answer that demonstrates good knowledge of the main natural and man-made hazards. The student has a limited understanding of the impact of harmful and dangerous factors on humans and the natural environment, and methods and techniques for protecting against them. Knowledge of the theoretical foundations of life safety in emergency situations, as well as the legal, regulatory, technical, and organizational foundations of life safety, is limited.
Excellent understanding of the anatomical and physiological consequences of human exposure to traumatic, harmful, and damaging factors, as well as first aid techniques.
A grade of 5-10 points is awarded for an answer that demonstrates insufficient knowledge of the main natural and man-made hazards. The student has a poor understanding of the impact of harmful and hazardous factors on humans and the environment, methods, and techniques for protecting against them, and a poor knowledge of the theoretical foundations of life safety in emergency situations, as well as the legal, regulatory, technical, and organizational foundations of life safety.
A grade of 1-4 points is awarded for an answer that demonstrates very weak knowledge of the main natural and man-made hazards. The student does not understand the impact of harmful and hazardous factors on humans and the environment, methods, and techniques for protecting against them, and lacks knowledge of the theoretical foundations of life safety in emergency situations. The student has a very poor knowledge of the legal, regulatory, technical, and organizational foundations of life safety.

FCCA

4. Assessment scale for analytical and practical assignments

When assessing responses to the SKILL and MASTER learning level assessment, the following criteria (situational tasks and assignments) are taken into account:

A mark (8-10 points) is awarded for an answer in which the student formulates the problem in the situational task in their own words; evaluates alternative solutions to the problem; professionally identifies the main hazards in the human environment and assesses the risk of their occurrence; quickly makes decisions on appropriate actions in emergency situations, recognizes life-threatening situations in emergency situations and injuries; and is able to provide first aid to victims.

Demonstrates a complete understanding of the problem. All tasks and assignments have been completed.

A mark (4-7 points) is awarded for an answer in which the student formulates the problem in the situational task in their own words; but does not provide alternative solutions to the problem; is able to identify the main hazards in the human environment but does not assess the risk of their occurrence; Recognizes life-threatening situations in emergency situations and injuries and is reasonably proficient in providing first aid to victims.

Demonstrates a significant understanding of the problem. Most of the task requirements have been met.

A grade of 1-3 points is awarded for a response in which the student formulates the problem in their own words in a situational task; poorly identifies the main hazards in the human environment and does not assess the risk of their occurrence; poorly recognizes life-threatening situations in emergency situations and injuries and is unable to provide first aid to victims.

Demonstrates a very limited understanding of the problem. Many of the task requirements have not been met.

A grade of 0 points is awarded for a response in which the student demonstrates a lack of understanding of the problem or does not provide an answer, nor even an attempt to solve the problem.

5. Presentation Grading Scale

	No answer -0%	**Minimum answer: 31-60%**	**A clearly stated, open-ended answer - 60-69%**	**Complete answer score - 70-84%**	**An exemplary, model, and worthy of imitation answer - 85-100%**	**Mark (in %)**
Problem disclosure	-	The problem is not resolved. There are no conclusions.	The problem is not fully addressed. Conclusions are not drawn or the conclusions are not substantiated.	The problem has been solved. An analysis of the problem has been conducted without the use of additional literature. Not all conclusions	The problem has been fully addressed. An analysis of the problem has been conducted, drawing on additional literature. Conclusions	

				have been drawn or substantiated.	have been drawn.	
Performance	-	The information presented is not logically connected. Professional terms are not used.	The information presented is not systematized and inconsistent. 1-2 professional terms are used.	The information presented is systematized and consistent. More than two professional terms are used.	The information presented is systematized, consistent, and logically linked. More than 5 professional terms are used.	
Design	-	No information technology (PowerPoint) was used. More than 4 errors in the information provided.	Information technology (PowerPoint) was used partially. 3-4 errors in the information provided.	Information technology (PowerPoint) was used. No more than two errors in the information presented.	Information technology (PowerPoint) was used extensively. There are no errors in the information presented.	
Answers to questions	-	No answers to questions	Only answers to basic questions	The answers to the questions are complete or partially complete.	Answers to questions are complete with examples and explanations.	

6. Rating scale for solving situational problems

№	Name of the indicator	Name of the indicator
1	Originality and persuasiveness	0-15
2	Understanding of the problem and adequacy of interpretation	0-25
3	Reasonable use of quantitative indicators and regulatory legal acts (relevance and reliability of information)	0-40
4	Key words (their importance for the stated topic, correct use, quantity)	0-10
5	Logic and consistency of oral expression	0-10
Total points		**Total points**

7. Template for grading scale for test items.

Each test assignment contains 20 closed-ended questions.

1. The assignments are given multiple-choice answers, with one correct answer and the rest incorrect.
2. The student must remember: in each multiple-choice assignment, there must be a correct answer.
3. Each correct answer is worth 5 points.
4. The overall grade is determined as the sum of the points earned.
5. Mark (in %).