

Федеральное государственное бюджетное образовательное учреждение
высшего образования
«Кемеровский государственный медицинский университет»
Министерства здравоохранения Российской Федерации

Department of Microbiology and Virology
31.05.01 General Medicine

Subject Microbiology, Virology

Evaluated competencies

Name of the category of general professional competencies	Competence code	Competence content	Indicators of competencies
Diagnostic instrumental research methods	General professional competence-4	To able to use medical devices in accordance with the procedure for providing medical care, as well as conduct examinations of patients in order to establish a diagnosis.	ИД-2 ОПК-4 It uses patient examination algorithms to establish a diagnosis, including in emergency situations, epidemics, and areas of mass casualties. ИД-5 ОПК-4 To be able to evaluate the results of a patient's examination when solving professional tasks

УТВЕРЖДАЮ

Заведующий кафедрой
Леванова Л.А.
« 28 » 08 2025 г.

LIST OF EXAMINATION QUESTIONS

General Microbiology

1. Define the concept of "microbiology." What is the subject of microbiology? List the main methods of microbiological (laboratory) diagnostics. Explain their purpose, advantages, and disadvantages.
2. Describe the methods of classification of microorganisms and the domains (empires) of life. List the taxonomic categories used in the classification of microorganisms. Define the terms "species", "biovar", "serovar", "phagovar", "morphovar", "pure culture", "strain", and "clone".
3. List the distinguishing features of prokaryotic cells from eukaryotic cells. Explain the concept of bacterial morphology and the main forms of bacteria (with examples). Provide an overview of bacterial nomenclature (with examples).
4. Describe the main anatomical structures of bacterial cells, their functions, and chemical composition. Discuss the methods used to study the organelles of bacterial cells. Types and methods of smear preparation. Types of microscopy, comparative characteristics.
5. Comparative characteristics of simple and complex staining methods. Purpose, essence of the Gram, Zilch-Nelsen, Ozheshka, Burri-Gins, Neisser, Romanovsky-Gimza staining methods.
6. Explain what a bacterial capsule is, its chemical composition, the conditions for capsule formation, and its functional significance for the macroorganism and the microorganism. Describe

the antigenic properties of the capsule. Explain how to identify a bacterial capsule. Provide examples of capsule-forming bacteria.

7. What is the cell wall of bacteria, and what are its functions? How are bacteria classified based on the type of cell wall and their structural features? Methods for identifying the type of bacterial cell wall. The antigenic properties of the cell wall.

8. What are the differences in the structure of the peptidoglycan of gram-positive and gram-negative bacteria? List the specific components of the cell wall of gram-positive and gram-negative bacteria. Explain what protoplasts, spheroplasts, and L-forms are, their origin, and their significance.

9. Tell us about the structure and chemical composition of the cytoplasmic membrane. What are mesosomes? Detection methods. What are the functions of CPM and mesosomes in bacteria? The role of CPM in the energy metabolism of bacteria.

10. Tell us about the structure, chemical composition and functions of the flagella and villi (pili) bacteria. Which antigens are associated with bacterial flagella. How bacteria are subdivided according to the number of flagella in a bacterial cell. List the methods for detecting flagella and pili.

11. What is the cytoplasm of bacteria? Describe the ribosomes of prokaryotes and their differences from the ribosomes of eukaryotes. What are volute grains and their properties? Methods for detecting volute grains. The significance of for the differential diagnosis of diphtheria.

12. How is the genetic material organized in bacteria, and what are its features? The mechanisms of bacterial DNA replication. The functions of the nucleoid and extrachromosomal hereditary factors. Describe the molecular genetic methods used in the diagnosis of infectious diseases.

13. Describe the mobile genetic elements: transposons, Is-elements, and integrons. Bacterial plasmids, their classification, structure, and general biological significance. The role of extrachromosomal hereditary factors in bacterial mutations and recombinations.

14. Name the forms of existence of bacteria. What are bacterial endospores? The importance of endospores for bacterial cells. What are the conditions for the formation of endospores? Stages of the sporulation process. Methods for detecting spores. Stages of spore germination.

15. Features of the structure of actinomycetes, taxonomic position. Describe individual representatives of the Nocardia-like (*Nocardioform*) actinomycetes – genera *Corynebacterium*, *Mycobacterium*. What diseases are caused by pathogenic *Actinomycetes*, *Corynebacterium* and *Mycobacterium*.

16. Features of the morphology and physiology of rickettsiae, their taxonomic position. Methods of studying rickettsiae. The host range and natural habitat of rickettsiae. The life cycle of rickettsiae. What is the mechanism of rickettsiae movement in the cytoplasm of infected cells? List the pathogenicity factors of rickettsiae. What diseases do rickettsiae cause, and what are their features? Methods of microbiological diagnosis of rickettsiosis.

17. Features of the morphology and physiology of chlamydia, taxonomic position. The life cycle of chlamydia. Methods of studying chlamydia. What are the pathogenic factors of chlamydia? What diseases do chlamydia cause? What are the main methods of microbiological diagnosis of chlamydiosis?

18. Features of the structure and physiology of spirochetes, taxonomic position. The main features that underlie the division of spirochetes into genera. A brief description of the genera *Treponema*, *Leptospira*, and *Borrelia*. List the pathogenicity factors of spirochetes. What diseases are caused by pathogenic spirochetes? Methods of study

19. Features of the structure and physiology of mycoplasmas, taxonomic position. What is the ecological niche of mycoplasmas? What is the parasitism of mycoplasmas? Methods of studying mycoplasmas. What diseases are caused by pathogenic mycoplasmas? List the main methods of microbiological diagnosis of mycoplasmas.

20. Describe the morphological and physiological features of *Legionella*, taxonomic position. What is the ecological niche of legionellas. Epidemiology and pathogenesis of legionellosis. Clinical manifestations of legionellosis. List the main methods of microbiological diagnosis.

21. Describe the structure and classification of fungi. List the methods of fungal reproduction. Describe asexual and sexual spores. List the pathogenic factors of micromycetes. Describe the main types of mycotoxins. Explain the role of micromycetes in medical practice. Methods of studying micromycetes.

22. What are viruses? List the main properties of viruses. Describe the morphology and structure of viruses. What is the type of symmetry and its variations? What are the functions of the supracapsule? How are viruses classified? Describe the types of interaction between virions and cells. What is virulence? Describe the stages of interaction between viruses and cells.

23. Define the "disjunctive method of virus reproduction." What are the characteristics of viral DNA and RNA? What are plusRNA-genomic and minusRNA-genomic viruses, and how do they differ? Features of reproduction of DNA- and RNA-containing viruses: synthesis of viral proteins and nucleic acids. Enzymes of virus reproduction. Give examples of DNA- and RNA-containing viruses.

24 How are viruses cultured in laboratory conditions? Describe the stages of virological research. Describe the biological models used in virology. What types of cell cultures are used for virus cultivation? How are they obtained? What is virus indication and what are the methods of indication?

25. What are the rules for collecting and transporting the test material in case of suspected viral infection? List the methods of microbiological diagnosis of viral infections. What are the rapid diagnostic methods? How are rapid diagnostic methods divided based on their specificity? What are the retrospective methods and what are their features? Describe the stages of the virological research method.

26. Describe the non-cellular forms of life. What diseases are caused by viroids and prions? What is a "prion", HrP, PrHc, PrPSc, PRNP? What are the modern human and animal diseases that are classified as prion diseases? What is the pathogenesis of all prion diseases? How does the accumulation of infectious prion protein occur?

27. What are bacteriophages? Describe the morphology and structure of bacteriophages. How are bacteriophages classified? What are "virulent" and "moderate" phages? Describe the stages of bacteriophage interaction with a cell. What are "lysogeny", "prophage", and "defective phage"? What are the methods of studying bacteriophages? What is the purpose of using bacteriophages in practice? Give examples.

28. What are the features of bacterial nutrition? How are bacteria classified based on their feeding habits and energy production methods? What are the mechanisms of bacterial nutrition? What is bacterial growth and reproduction? How do bacteria reproduce? List the phases of bacterial population reproduction.

29. What are the features of bacterial metabolism? How does a microbial cell obtain energy? What are the main types of biological substrate oxidation (aerobic and anaerobic)? Practical applications in the bacteriological method.

30. What are the cultural properties of bacteria? Classification of nutrient media and the requirements for them. Methods for isolating pure cultures of bacteria. Methods for studying the cultural properties of bacteria when they grow on liquid and solid nutrient media.

31. What are the biochemical properties of bacteria? Classification of bacterial enzymes. Practical applications of studying the biochemical activity of bacteria in medical microbiology. Methods for studying the saccharolytic and proteolytic activity of bacteria.

32. Describe the characteristics of genotypic and phenotypic variability in bacteria. What are modifications, and what are the different types of modifications? What are mutations? Classification of mutations based on their origin, direction, and extent. Bacterial repair systems. The stages of DNA repair in bacteria.

33. Name the features of recombination in bacteria. What are the methods of transferring genetic information in bacteria? What are donor and recipient bacteria? What role do sex pili and moderate bacteriophages play in genetic recombinations? Describe conjugation, transduction, and transformation.

34. What are "antibiotics" and "antimicrobial chemotherapeutic agents"? Classification of antibiotics by source, mechanism, spectrum, and type of action. Give examples. Possible side effects of antibiotics. Principles of rational antibiotic therapy.

35. Define the concepts of "Infection" and "Infectious Disease" and explain the differences between them. Describe the various forms of infectious process (infection) based on the nature of the pathogen, origin, conditions of infection, and the nature and duration of the infection.

36. What is an infectious disease, and what are the characteristics of an infectious disease? List and describe the main periods of an infectious disease. How is an infection classified based on its mechanism, mode of transmission, and entry point?

37. What is "Pathogenicity" and "Virulence" of bacteria. How can virulence be measured. Genetic control of virulence, what are "islands of pathogenicity". Describe the pathogenicity factors of bacteria with the function of adhesion, invasion and protection from phagocytosis. Examples and methods of detection.

38. What are "Toxins" of bacteria? Give a general description of exo- and endotoxins of bacteria. The main properties and structure of protein toxins. What types of toxins are distinguished and what is their mechanism of action? Give examples and methods for detecting them. Give a general description of endotoxin and its mechanism of action.

39. What are the genetic mechanisms of bacterial drug resistance to antibiotics? The role of plasmids and integrons in the formation of bacterial antibiotic resistance. The phenotypic

manifestation of antibiotic resistance. What are the methods for determining the sensitivity of bacteria to antibiotics? How are the results evaluated?

40. Define the concept of "Antigen" and describe the properties of antigens. What is a "determinant group" or "epitope" of an antigen? Identify the antigens possessed by bacteria and viruses. Explain their significance for the macroorganism and the diagnosis of infectious diseases. Provide examples.

41. Define "Antibodies" and describe their nature. List the properties of antibodies. Draw the molecular structure of antibodies. What is the "valence of antibodies", "domain", "active center", and "paratope"? Describe all classes of immunoglobulin antibodies and their morphofunctional features.

42. What is the mechanism of antigen-antibody interaction, and how many phases does binding consist of? What are serological reactions, and what are their purposes? What are the different types of reactions? Explain the reactions that involve the aggregation of antigens. Describe the purpose, ingredients, mechanism, and interpretation of the results. Provide examples of their use.

43. What is "complement", what properties does it have, what are the activation pathways? Tell us about the reactions that involve complement. The purpose of the reaction, the ingredients, the mechanism, and the evaluation of the results. Give examples of their use.

44. What is a neutralization reaction? What are the different methods of conducting a neutralization reaction? What is the purpose of using neutralization reactions, what are the ingredients, and what is the mechanism of the reaction? How are the results evaluated? Give examples of the use of neutralization reactions in the laboratory diagnosis of infectious diseases.

45. What serological reactions occur with a "label"? What are the features of such reactions? What labels are used and what are the requirements for them? The purpose of the test, the ingredients, the mechanism, and the results of immunofluorescence (IFM), enzyme-linked immunosorbent assay (ELISA), and radioimmunoassay (RIA).

46. Tell us about the reactions used in virology: hemagglutination inhibition (RHIA), immune electron microscopy (IEM), biological neutralization (RBN), and immune blotting reaction. Explain the essence of these methods, the stages of their implementation, and their use in the diagnosis of infections. Provide examples.

47. What are immunoprophylaxis and immunotherapy? What are their purposes? Explain the principles of immunoprophylaxis and immunotherapy. What are immunobiological drugs? Which UPS groups are distinguished?

48. What are "Vaccines"? What is the purpose of using UPS data? List the main groups of vaccines. General requirements for vaccines. List the vaccines on the vaccination calendar and the dates of vaccination. Indications and contraindications for vaccination.

49. Tell us about antibody-based UPS. What is the purpose of their use? Describe the characteristics of therapeutic and prophylactic serums and immunoglobulins: antitoxic, antibacterial, and antiviral. Production, purification, and titration. What are the possible complications of serotherapy and how can they be prevented?

50. Explain the organization and categories of microbiological laboratories. Describe the equipment used in these laboratories. Explain the requirements for staff members. Explain the rules for

working with biological materials in basic-level and maximum-retention microbiological laboratories. Describe the methods of laboratory diagnosis of infectious diseases, their advantages and disadvantages.

51. What are highly contagious infections? What are the characteristics of the causative agents of HCI. What is currently included in the concept of HCI in accordance with the International Health Regulations (IHR) of 1969? The main causative agents of HCI. What are quarantine infections and quarantine? What anti-epidemic measures are carried out by medical personnel. Features of microbiological diagnostics of HCI. What are the requirements for the premises and staff of the HCI laboratory?

52. Microbe as an object of disinfection and sterilization. What is "contamination" and "decontamination"? What is "disinfection", describe the main methods of disinfection. What is "sterilization", describe the main methods of sterilization. What is "asepsis and antisepsis"? Describe the methods of asepsis and antisepsis. Antiseptic agents. Asepsis and antisepsis. How is the quality of sterilization and disinfection controlled?

53. What is an oncovirus or an oncogenic virus? What is the meaning of L. A. Zilber's virologic theory of the origin of cancerous tumors? The mechanism of oncogenesis. The main properties of oncogenic viruses. Which viruses can cause tumors (cancer) in humans?

54. Define the terms "Microecology", "Ecological niche", "Microbiota", and "Biotope". What biotopes are distinguished in the human body? What are the features of the microecology of the gastrointestinal tract? List the factors that influence the formation of the human body's microflora. Explain the importance of a healthy microflora for human health. How is the microflora classified and what does it consist of?

Private Bacteriology

1. Describe the fungi of the genus *Candida*. Name the causes of candidiasis and the risk groups. Tell us about the clinical manifestations of candidiasis in different biotopes. List the main methods of laboratory diagnosis. What are the principles of treatment? Describe the characteristics of antimycotics.

2. Classify the causative agents of syphilis and name their main properties. Explain the pathogenesis of syphilis and the methods of laboratory diagnosis. How does syphilis manifest itself in the oral cavity in the acquired and congenital forms? Are there any specific methods of prevention?

3. Classify the causative agent of leptospirosis and describe its main properties. Explain the epidemiology of leptospirosis. What are the characteristics of Vasilyev-Veyl disease? Discuss the microbiological diagnosis, specific prevention, and treatment of leptospirosis.

4. Describe the causative agents of Lyme disease. Tell us about the epidemiology of Lyme disease. What are the clinical manifestations of Lyme disease? Describe the microbiological diagnosis of Lyme disease.

5. What is "louse-borne Lyme disease," and describe the causative agents. Tell us about the epidemiology and pathogenesis of epidemic and endemic relapsing fever. How is the microbiological diagnosis and prevention of relapsing fever performed?

6. Provide a classification and identify the main causative agents of staphylococcal infections. What are the biological properties of staphylococci? What are the clinical manifestations of staphylococcal diseases? What is the role of staphylococci in the development of oral diseases? What are the methods of microbiological diagnosis of sepsis and localized GVIs? What are the immunobiological preparations for the treatment and prevention of staphylococcal infections?
7. Give a classification and name the main causative agents of streptococcal infections. What are the biological properties of streptococci? What is the role of different types of streptococci in human pathology? Describe the methods of microbiological diagnosis of streptococcal sepsis, localized forms of infections, and pneumonia. Name the drugs used for the treatment and prevention of streptococcal infections. What is the purpose of the Dick reaction?
8. Give a classification and name the main causative agent of meningococcal infection. What are the biological properties of meningococcus? List the pathogenicity factors of the pathogen. Tell us about the epidemiology, pathogenesis, and clinical forms of meningococcal infection. What are the main methods of microbiological treatment for various forms of meningococcal infection? Which immunobiological preparations are used for the prevention and treatment of meningococcal infection?
9. Give a classification and name the main causative agent of gonococcal infection. What are the biological properties and pathogenicity factors of the causative agent? Describe the epidemiology and pathogenesis of gonococcal infection. How does gonococcal infection manifest itself in the oral cavity? Name the main microbiological methods used in various forms of gonococcal infection. What is the purpose of using the gonococcal vaccine, and what is it?
10. Give a classification and name the main causative agents of gas gangrene. What are the biological properties and pathogenicity factors of gas gangrene pathogens? Describe the epidemiology and pathogenesis of gas gangrene infection. What are the features of microbiological diagnosis of gas gangrene? How is gas gangrene prevention carried out?
11. Give a classification and name the main properties of the tetanus pathogen. Tell us about the factors of pathogenicity, epidemiology, and pathogenesis of tetanus. Name the main methods of microbiological diagnosis of tetanus. List the IBDs for the prevention and treatment of tetanus. The timing of vaccination.
12. Give a classification and name the main pathogens of non-spore-forming anaerobic infections (NSAI). The role of *Bacteroides* and *Fusobacteria* in the development of purulent-inflammatory diseases of the oral cavity. Tell us about the pathogenicity factors of the pathogens. Epidemiology and pathogenesis of NAB. Basic methods of microbiological diagnosis of NAB. List the methods of creating anaerobic conditions.
13. Give a classification and name the main properties of the diphtheria pathogen. Tell us about the pathogenicity factors, epidemiology, and pathogenesis of diphtheria. Describe the clinical manifestations of the disease. Explain the methods of microbiological diagnosis of diphtheria. What is the purpose and how is the toxigenicity of the diphtheria pathogen determined? What are the treatment and prevention methods for diphtheria, and what are the vaccination schedules? What is the purpose and how is the Schick reaction performed, and how are the results interpreted?
14. Give a classification and name the main causative agents of tuberculosis. What are the biological properties of the causative agent and what causes them? Epidemiology and pathogenesis of tuberculosis. What is a tuberculous tubercle and what is its role for the macroorganism? Methods of microbiological diagnosis of tuberculosis and methods of preparing the test material for analysis.

How and what is the specific prevention of tuberculosis, and what are the timing of vaccinations? What are the Mantoux test and the Diaskintest? What immunobiological drugs are used for Mantoux and Diaskintest tests, and what is their diagnostic value?

15. Give a classification and name the main properties of the causative agent of leprosy. What is the epidemiology and pathogenesis of leprosy? Clinical forms of leprosy and their characteristics. The main methods of microbiological diagnosis of leprosy. What is the purpose of the Mitsuda reaction?

16. Give a classification and name the main properties of the causative agents of typhus. Describe the epidemiology of epidemic and endemic typhus. The pathogenesis of epidemic typhus. What is Brill's disease? How to differentiate primary typhus from Brill's disease? Microbiological diagnosis of typhus. Specific prevention of epidemic typhus.

17. Classification and main causative agents of brucellosis. List the biological features of all causative agents of brucellosis. What is the epidemiology, pathogenesis, and clinical picture of brucellosis? Methods of microbiological diagnosis of brucellosis. What is the purpose of the Hedderson, Wright, and Coombs reactions? What drug is used to detect GZT? What is the immunobiological preparations used for the prevention of brucellosis, and who is vaccinated?

18. Classification and basic properties of the tularemia pathogen. Pathogenicity factors, epidemiology and pathogenesis of tularemia. What is the clinical picture of tularemia. Describe the main methods of microbiological diagnosis of tularemia. What is the purpose of the allergic test, what drug is used, and how is the result evaluated. Specific prevention and principles of treatment of tularemia.

19. Classification and basic properties of the plague pathogen. Name the main pathogenicity factors of the pathogen. Epidemiology, pathogenesis, and clinical forms. Describe the main methods of microbiological diagnosis of plague. What are the main tests used to identify a pure culture? How is specific prevention and treatment of plague carried out, and what are the immunobiological preparations?

20. Classification and basic properties of the anthrax pathogen. List the main pathogenicity factors of the pathogen. What is the epidemiology and pathogenesis of anthrax? The main clinical forms of anthrax. Methods of microbiological diagnosis of anthrax. What tests are used to identify a pure culture? How is anthrax prevention and treatment carried out? What are the immunobiological preparations?

21. Give a classification of influenza viruses. Tell us about the morphology of influenza viruses and their main properties. Describe the antigens of influenza viruses and their role in the epidemiology and pathogenesis of the disease. Explain the features of the epidemiology of influenza. Describe the clinical picture of influenza. Provide a description of the methods used for microbiological diagnosis of influenza. Describe the vaccines available for the prevention of influenza and their characteristics. Provide information about the medications used for the treatment of influenza.

22. Give a classification of parainfluenza viruses. Tell us about the morphology of parainfluenza viruses and their main properties. Describe the epidemiology of parainfluenza infection. Explain the clinical forms of parainfluenza infection. Describe the methods of microbiological diagnosis of parainfluenza infection. What are the characteristics of the cytopathic effect in parainfluenza infection? What are the immunobiological preparations use for the prevention and treatment of parainfluenza infection?

23. Give a classification of coronaviruses. Tell us about the morphology of coronaviruses and their main properties. Describe the epidemiology of coronavirus infection. Explain the clinical picture of coronavirus infection. Provide information about the methods of microbiological diagnosis of coronavirus infection. Discuss the use of immunoglobulin for the prevention and treatment of coronavirus infection.

24. Give a classification of adenoviruses. Tell us about the morphology of adenoviruses and their main properties. Describe the epidemiology and pathogenesis of adenovirus infection. Explain the different clinical forms of adenovirus infection. What mechanisms are associated with the oncogenicity of adenoviruses. Describe the methods of microbiological diagnosis of adenovirus infection.

25 What is the taxonomic position of the rubella virus? Tell us about the morphology and structure of the virus. What are the features of the cultivation of the rubella virus? What is the epidemiology, pathogenesis, and clinical manifestations of rubella? What is congenital rubella? What are the characteristics of congenital rubella syndrome? What are the main methods of microbiological diagnosis of rubella infection? What is the specific prevention?

26 What is the taxonomic position of the measles virus? Tell us about the morphology and structure of the virion. What are the features of the measles virus? Epidemiology and pathogenesis of measles. What are the symptoms of measles? What are Filatov-Belsky spots, and where are they located? What is subacute sclerosing panencephalitis (SSPE)? What are the characteristics of measles virus strains that cause SSPE? How is the microbiological diagnosis, prevention, and treatment of measles performed?

27. What is the taxonomic position of the mumps virus? Tell us about the morphology and structure of the virion. Describe the epidemiology and pathogenesis of mumps. What are the different clinical forms of mumps? How is the microbiological diagnosis, prevention, and treatment of measles performed?

28. Explain the classification of herpesviruses and the taxonomic criteria used to divide them into subfamilies. Discuss the morphology and structure of the virion. What are the features of herpesvirus reproduction? Features of the pathogenesis of herpesvirus infection. What diseases are caused by herpesviruses. The role of herpesviruses in the development of cancer. The effect of herpesvirus infection on pregnancy.

29. Give a classification of herpes simplex viruses (HSV). Methods of HSV cultivation. What is the epidemiology of HSV-1 and HSV-2? What are the features of the pathogenesis of HSV? Where is the latent infection localized? What factors contribute to the reactivation of herpesviruses? The clinical picture of the infection. The main methods of microbiological diagnosis of herpesvirus infection. What are Tzanck cells and Cowdry bodies, and how are they defined? What are the UPS used for immunotherapy of herpesvirus infection?

30. What is "Chickenpox" and "Herpes zoster"? Taxonomic position of the pathogen. What is the epidemiology of chickenpox and herpes zoster? Pathogenesis, clinical picture and epidemiology of chickenpox and herpes zoster. Basic methods of microbiological diagnostics epidemiology of chickenpox and herpes zoster. Which immunobiological preparations are used to prevent chickenpox.

31. Give a classification of the Epstein-Barr virus (EBV) and cytomegalovirus. What is characteristic of the cytomegalovirus? Epidemiology and pathogenesis of EBV and cytomegalovirus. Clinical manifestations of EBV and cytomegalovirus. What tumors does EBV

cause? Congenital cytomegalovirus and its forms. Basic methods of microbiological diagnosis of EBV and cytomegalovirus. What is "owl eye" and how is it defined? What are the UPS used for immunotherapy of herpesvirus infection?

32. Give the classification of the hepatitis B virus. What is the morphology of the hepatitis B virus? What is the antigenic structure of the hepatitis B virus? The significance of these antigens in the pathogenesis of the disease. What types are possible in HBV infection? How does the replication of the hepatitis B virus occur? The epidemiology and pathogenesis of hepatitis B. The oncogenic properties of the hepatitis B virus. List the main directions of hepatitis B diagnostics. Give the characteristics of serological markers. How is the specific prevention of hepatitis B carried out?

33. Give a classification of the hepatitis C virus. What is the morphology of the hepatitis C virus? What is the peculiarity of the hepatitis C virus genome? What are the genotypes of the hepatitis C virus and their significance for the diagnosis and treatment of hepatitis C? Epidemiology and pathogenesis of hepatitis C. List the main areas of diagnosis of hepatitis C. Markers of hepatitis C. Oncogenic properties of the hepatitis C virus.

34. Give a classification of the hepatitis A virus. What is the morphology of the hepatitis A virus? What are the features of the epidemiology and pathogenesis of hepatitis A? What is the nature of the virus's pathogenic effect on hepatocytes? Describe the morphological syndromes of hepatitis A and its clinical presentation. List the main methods of microbiological diagnosis and markers of hepatitis A. How is specific prevention of hepatitis A carried out?

35. Give the taxonomic position of hepatitis D and E viruses. Tell us about the morphology and structure of hepatitis D and E viruses. What is the epidemiology and pathogenesis of hepatitis D and E? What are the clinical features of hepatitis D and E? How is the microbiological diagnosis of hepatitis D and E performed? What are the main serological markers?

36. Give the taxonomic position of the human immunodeficiency virus. Tell us about the morphology and structure of HIV. How is HIV cultured? What cells are troped by HIV and where are they concentrated in the body. How does HIV reproduce? The epidemiology and pathogenesis of HIV infection. The clinical manifestations of HIV infection. The main approaches to the diagnosis of HIV infection. List the main groups of antiretroviral drugs and their mechanism of action.

37. Describe the classification and morphology of picornaviruses. Which viruses are classified as human enteroviruses? List the main properties of enteroviruses. Epidemiology, pathogenesis, and clinical forms of enterovirus infections. List the main biological models for enteroviruses. List the main methods of laboratory diagnosis of enterovirus infections.

38. Tell us about the classification and morphology of the poliomyelitis virus. What is the epidemiology and pathogenesis of poliomyelitis? Name the main clinical forms of poliomyelitis. Describe the main methods of microbiological diagnosis of poliomyelitis. How is specific prevention of poliomyelitis carried out? Tell us about the advantages and disadvantages of the Sabin live vaccine and the Salk inactivated vaccine.

39. What are arboviruses? Tell us about the taxonomic position of the tick-borne encephalitis virus. Morphology of the tick-borne encephalitis virus. What is the epidemiology and pathogenesis of tick-borne encephalitis? Name the main clinical forms of tick-borne encephalitis. Describe the main methods of microbiological diagnosis of tick-borne encephalitis. How is specific prevention and immunotherapy of tick-borne encephalitis carried out?

40. Tell us about the classification and morphology of the rabies virus. What is the epidemiology of rabies? What are the different types of rabies virus? Tell us about the pathogenesis of the main clinical forms of rabies. Describe the main methods of microbiological diagnosis of rabies. What is the specific prevention of rabies?
41. Give the taxonomic classification of the causative agents of hemorrhagic fevers, such as the Omsk and Crimean-Congo fevers. Tell us about the morphology of the viruses, the epidemiology, and the pathogenesis of these infections. Describe the methods of laboratory diagnosis of hemorrhagic fevers. How is specific prevention of these infections carried out?
42. Tell us about the classification and morphology of rotaviruses. What are the features of the epidemiology, pathogenesis, and clinical picture of rotavirus infection? Name and describe the methods of laboratory diagnosis of rotavirus infection. How is specific prevention of rotavirus infection carried out?
43. Tell us about the classification of enteroviruses. What are the properties of enteroviruses? What infections are caused by enteroviruses? What is the epidemiology and pathogenesis of enterovirus infections? What are the main methods of laboratory diagnosis of enterovirus diseases?
44. General characteristics of the Enterobacteriaceae family. List the biochemical characteristics that underlie the differentiation of enterobacteria within the family. Describe the main antigens of enterobacteria and their role in the differentiation of this family. What are the pathogenic factors of enterobacteria? What is a secretory system? What types of enterobacteria are there? What is their role? What is the role of individual enterobacteria in the development of opportunistic infections?
45. Give the taxonomic position of *E. coli*. Describe the biochemical and antigenic properties of *E. coli*. What is the significance of the antigenic structure in the identification of *E. coli*? What groups of diseases are caused by *E. coli*? Describe the main diarrheagenic *E. coli*. Explain the main method of microbiological diagnosis of *E. coli* infections.
46. Give the taxonomic position and characteristics of the causative agents of typhoid and paratyphoid fever. What is the epidemiology and pathogenesis of typhoid fever? Describe the bacteriological method of research. What can serve as the test material for typhoid fever, and what determines the choice of the test material? What is the Vidal reaction? What is the diagnostic value of this reaction in the diagnosis of typhoid fever? What reaction is used to detect carriers of typhoid fever? Name the immunobiological drugs used for the prevention and treatment of typhoid fever.
47. What is the taxonomy of *Salmonella*? Morphology and physiological properties of *Salmonella*. The antigenic structure of *Salmonella* and its significance for identification. What is the Kaufman-White scheme? Epidemiology, pathogenesis, and clinical forms of salmonellosis. Principles of microbiological diagnosis of salmonellosis.
48. Describe the classification and morphological features of the causative agents of Shigellosis. The antigenic structure of *Shigella* and the current taxonomy of the genus. Name the biochemical properties of *Shigella*, and list the pathogenicity factors of *Shigella*. What are the features of the epidemiology and pathogenesis of shigellosis? What are the main clinical forms and methods of microbiological diagnosis? What are the immunobiological drugs for the treatment of shigellosis?

49. What is the taxonomy of the cholera pathogen? Describe the morphological and cultural properties of the cholera pathogen. What are the biochemical properties of the cholera pathogen? What is the basis for distinguishing between the biovars of the cholera pathogen, and how are they differentiated? What antigens does the cholera pathogen possess? What are the serogroups and serovars of the cholera vibrio? List the pathogenicity factors of the cholera pathogen. Describe the epidemiology of cholera. Explain the clinical presentation of cholera and the methods of microbiological diagnosis. How is cholera prevention carried out?

50. What is "eubiosis", "dysbiosis", and "dysbacteriosis"? What are the causes of microecological disorders? Classify dysbacteriosis according to its etiological factor, prevalence, and severity. Explain the features of laboratory diagnostics of intestinal dysbacteriosis. Describe the principles of correcting microecological disorders. What are "probiotic", "prebiotic", and "symbiotic"? Provide examples.

51. What are food poisoning. How are FP classified? What are the differences between food poisoning and infectious diseases with an alimentary route of transmission. List the main causative agents of food toxic infections and food toxicoses. Describe the etiopathogenesis of food poisoning. What are the principles of bacteriological examination in FP? Prove the etiological role of opportunistic pathogens in the development of food poisoning.

52. *Clostridium botulinum* and *Staphylococcus aureus* as causative agents of food intoxication (toxicosis). Characteristics of the causative agent of botulism. Ecology and distribution. Epidemiology and pathogenesis of botulism. What are the properties of *Staphylococcus aureus* that cause food intoxications (toxicoses)? Epidemiology and pathogenesis. How is laboratory diagnosis performed for food intoxications? Medical management of food poisoning. Specific prevention and treatment of botulism.

53. Name the main causative agents of superficial mycoses (keratomycoses) and epidermophytoses (dermatomycoses, dermatophytoses). What is the epidemiology, pathogenesis, and clinical picture of superficial mycoses (keratomycoses)? Name the main methods of laboratory diagnosis.

54. Name the causative agents of subcutaneous (or subcutaneus) mycoses and systemic (or deep) mycoses. What is the epidemiology, pathogenesis, and clinical picture of subcutaneous mycoses? How is laboratory diagnosis performed?

List of practical skills

1. Prepare a smear from various types of patient material and stain it using simple or complex methods.
2. Microscope the smears using an immersion light microscope system.
3. Describe the morphology of the microorganisms in the smears.
4. Culture the material to isolate aerobic or anaerobic microbes.
5. Use an anaerobic culture system for the microbes.
6. Sterilize the bacterial culture and transfer it to a slanted agar plate.
7. Describe the cultural properties of various bacteria.
8. Evaluate the biochemical properties of microbes on "motley" media.
9. Perform an experiment to determine the sensitivity of bacteria to antibiotics using the disk-diffusion method.
10. Evaluate the results of determining the sensitivity of bacteria to antibiotics using a qualitative method.
11. Determine the minimum inhibitory concentration of an antibiotic using the serial dilution method.
12. Identify the isolated pure culture of a microbe based on its antigenic and pathogenic properties.
13. Evaluate the results of serological reactions used in the diagnosis of infectious diseases. Formulate a conclusion.
14. Fill out a referral for research on various infectious diseases.
15. Choose an immunobiological drug for specific prevention and immunotherapy of infectious diseases