**THE LIST OF THEORETICAL QUESTIONS AND PRACTICAL SKILLS TO THE CONCLUDING LESSON №1,5FOR STUDENTS OF SPECIALITY «GENERAL MEDICINE». CONCLUDING LESSON №1 FOR STUDENTS OF DENTISTRY FACULTY**

**The list of theoretical questions to the concluding lesson №1**

**for students of speciality «General medicine»**

1. Definition of microbiology as the science. Branches of microbiology: general, medical, veterinary, technical, agricultural, ocean, space microbiology. Medical microbiology and its sections: bacteriology, virology, protozoology, mycology.
2. Stages of development of Microbiology, its branches. Medical Microbiology. History and scope. Impact in Microbiology made by L. Pasteur.
3. Origin and evolution of microorganisms. Modern classification of procaryotes. Bacterial taxonomy. Main taxons. Species as the main taxonomic unit.
4. Morphology and bacterial structure. Role of bacterial components of bacterial cells in vital activity of bacteria and pathogenesis of infectious diseases. Differences between procaryotic and eukariotic cells.
5. Chlamydiae. Classification. C.psittaci, C.trachomatis, C.pneumoniae. General properties. Life cycle. Cultivation of chlamydiae.
6. Morphology of Rickettsia. Methods of staining of Rickettsia.
7. Staining of bacteria. Dyes used in microbiology. Differential stains. Gram’s stain. Principle. Procedure. Mechanisms: chemical and physical theories.
8. Metabolism of microorganisms. Bacterial nutrition. Classification of bacteria on the basis of nutritional requirements.
9. History of discovery of viruses. D.I.Ivanovsky as the founder of virology. Stages of development of virology. Morphology and viral ultrastructure. Types of symmetry. Chemical composition. Functions of viral subunits.
10. Sterilization, disinfection, and antisepsis. Methods of sterilization. Methods of disinfection. Classification of disinfectants. Chemical disinfectants.
11. Bacterial growth and multiplication. Phases of bacterial growth, starting with an inoculum of stationary phase cells.
12. Enzymes of microorganisms. Role of enzymes in metabolism, the conversion of energy and pathogenicity of bacteria.
13. Antibiotics. History of discovery. Role of A.Fleming. Classification. General criteria for effective antibiotic action. General principles of effective antibacterial therapy.
14. Normal microflora of the human body. Role of normal microflora in the physiological and pathological processes. Gnotobiology. Role of I.I. Metchnicoff in the development of study of normal microflora. Dysbacteriosis and causes of its origin.
15. The notion of chemotherapy and chemotheraupeutic agents. Chemotheraupeutic index. Mechanism of antibacterial action of Sulfonamides. Role of P.Erlich and T.Domagk in the development of study of chemotherapy.
16. Pure cultures of microorganisms, their significance for the theory and practice of microbiology. Principles of isolation and identification of pure cultures.
17. Extra chromosomal genetic elements of bacteria. Plasmids, their properties and classification. Transposable genetic elements:insertion sequences and transposons.
18. Viruses. Definition and properties. Classification. Morphology of viruses. Virion structure. Chemical properties. Functions of viral components.
19. Culture and isolation of viruses. Types of cell cultures: primary, diploid and heteroploid cultures. Detecting viral growth in cell cultures.
20. Bacterial metabolism and the conversion of energy Respiration of bacteria. Anaerobes. Methods of anaerobic culture. Anaerobic jar. GASPAK.
21. Clinical microbiology. Collection and transport of clinical specimens. Specimen containers and their transport. Handling of speciment in the laboratory. Selection of laboratory investingations.
22. Achivements in microbiology. Modern methods of detection of pathogen-specific macromolecules. Detection of nucleic acid sequences: nucleic acid probe tests, polymerase chain reaction.
23. Modern views on the nature and origin of viruses. Position of viruses in the system of the alive. Means of classification and naming of viruses. Families of DNA viruses. Families of RNA viruses. Some important members.
24. Bacteriophage. History of its discovery. General characteristics. Structure and replication. Types of bacteriophage infection: virulent (lytic) and temperate (lysogenic) infections. Phage typing of bacteria. Using bacteriophages for phage therapy and phage prophylaxis.
25. Types of viral infection of a cell: abortive, lytic, and persistent infections. The stages of viral infection. The viral replication cycle: recognition of and attachment to the target cell, penetration, uncoating, macromolecular synthesis, assembly, release.
26. Enzymes of microorganisms, classification, their role in metabolism. Use for identification of bacteria. Enzymes of pathogenicity.
27. Host defenses against viral infection: natural barriers, nonspecific immune defenses, antigen-specific immune responses. Viral immunopathogenesis.
28. Viral detection: hemadsorption, hemagglutination. Hemagglutination inhibition test. Mechanism and tecnique. Interpretation of results.
29. Study of morphology of bacteria. Optical methods: oil immersion microscopy, phase contrast microscopy, dark ground microscopy. Staining of bacteria.
30. Capsule. Functions. Demonstration of capsule. Capsular stain. India ink method (after Burri-Gience).
31. Spirochetes. Taxonamy, classification, general properties, morphological sturture. The most common pathogens.
32. Bacterial taxonomy. Modern principles of bacterial classification: division, class, order, family, tribe, genus, species. Nomenclature and main taxons. The species concept in bacteriology.
33. Chemical composition of bacterial cell. Essential elements, their sources, and functions in Prokaryotes. Nucleic acids, proteins, lipids, and carbohydrates, their biosynthesis and functions.
34. Bacterial methabolism. Nutritional requirements of bacteria. Culture media. The basic requirement to culture media. Classification of media.
35. Bacterial structure. Differences between prokaryotic and eukakyotic cells. Cell envelope, cytoplasmic components, external structures (capsules, flagella, and pili) of bacterial cell.
36. Dyes used for bacterial spore staining. Spore staining. Modified acid fast techniques (Gansen΄s method).
37. Cultivation of viruses. Animal inoculation indication of the viruses in inoculated animals.
38. Discovery of viruses. Main stages in the development of virology. Modern classification of viruses.
39. Achivements in microbiology. R.Koch as the founder of microbiology.
40. Acid fast bacteria. Ziehl Neelsen stain. Principle and technique.
41. Bacterial metabolism. Respiration of bacteria. Classification of bacteria according to type of respiration. Anaerobes. Anaerobic culture methods of isolating anaerobic pure cultures.
42. Viral replication. Relationship between the virus and the host cell. Stages of viral replication. Replication cycle of human DNA viruses. Replication cycle of human RNA viruses.
43. Spores. Structure of spores. Function. Formation of spores. Types of bacterial spores. Spore stain.
44. The family Mycoplasmataceae. Classification. General characteristics. Morphological properties and culture. Staining of mycoplasma.
45. Protozoa. Classification. General characteristics. Morphological properties. Microscopic detection: blood samples, tissue samples, sputum samples. Specimen collection. Examination. The Romanovsky-Giemsa staining.
46. Cell envelope. Components. Cell wall. Structure in Gram-positive and Gram-negative bacteria. Functions. Differential stains. Gram΄s stain.
47. Flagella. Basal structure of bacterial flagellum. Types of flagellar arrangement. Fimbriae (pili). Functions. Demonstration. Dark ground (field) microscopy. Staining techniques.
48. Protoplasts, spheroplasts, L.forms of bacteria. Morphology, type of growth. Role in the human pathology.
49. Pneumocystis carinii. Morphology and taxonomic status. Life cycle. Staining by Giemsa method.

**The list of practical skills and tasks to the concluding class № 1**

**for students of speciality «General medicine»**

1. Prepare the smear from mixture of microorganisms for finding of bacteria of different species.
2. Stain the smear, prepared from suspension of microbs, using the Gram method.
3. Prepare the smear from mixture of microorganisms and stain it by methylene blue.
4. Sterilize loop in the bunsen flame.
5. Stain the smear, prepared from suspension of microbs, using the Romanowsky-Giemsa method.
6. Stain the smear, prepared from suspension of microbs, using Ziehl-Neelsen method.
7. Prepare the smear from mixture of microorganisms and stain it by watery solution of fuchsin.
8. Take into account and estimate result of compliment fixation test for serodiagnosis.
9. Make inoculation of microorganisms in solid nutrient medium from the clinical specimen by tampon.
10. Determine microorganisms by morphologic features in microbiologic specimen.
11. Make inoculation of microorganisms in semiliquid nutrient medium from the clinical specimen by loop.
12. Make inoculation of microorganisms in semiliquid nutrient medium from the clinical specimen by pipette.
13. Determine microorganism by morphologic features in microbiologic specimen.

**The list of theoretical questions to the concluding lesson № 5**

**for students of speciality «General medicine»**

1. Viruses. Definition and properties. Classification. Morphology of viruses. Virion structure. Chemical properties. Functions of viral components.
2. Culture and isolation of viruses. Types of cell cultures: primary, diploid and heteroploid cultures. Detecting viral growth in cell cultures.
3. Modern views on the nature and origin of viruses. Position of viruses in the system of the alive. Means of classification and naming of viruses. Families of DNA viruses. Families of RNA viruses. Some important members.
4. Bacteriophage. History of its discovery. General characteristics. Structure and replication. Types of bacteriophage infection: virulent (lytic) and temperate (lysogenic) infections. Phage typing of bacteria. Using bacteriophages for phage therapy and phage prophylaxis.
5. Types of viral infection of a cell: abortive, lytic, and persistent infections. The stages of viral infection. The viral replication cycle: recognition of and attachment to the target cell, penetration, uncoating, macromolecular synthesis, assembly, release.
6. Host defenses against viral infection: natural barriers, nonspecific immune defenses, antigen-specific immune responses. Viral immunopathogenesis.
7. Viral detection: hemadsorption, hemagglutination. Hemagglutination inhibition test. Mechanism and tecnique. Interpretation of results.
8. Cultivation of viruses. Animal inoculation indication of the viruses in inoculated animals.
9. Discovery of viruses. Main stages in the development of virology. Modern classification of viruses.
10. Viral replication. Relationship between the virus and the host cell. Stages of viral replication. Replication cycle of human DNA viruses. Replication cycle of human RNA viruses.
11. Paramyxoviruses. Classification. General characteristics. Measles virus. Mumps virus. Parainfluenza virus. Respiratory syncytial virus. The genus Rubivirus. General characteristics. Epidemiology. Clinical disease. Laboratory diagnosis. Treatment. Prevention.
12. Adenoviruses. General characteristics: structure, serotypes. Epidemiology. Pathogenesis and clinical disease. Laboratory diagnosis. Treatment. Prevention.
13. Poxviruses. Classification. Sructure. Smallpox, cowpox, and monkeypox. Epidemiology, clinical disease. Laboratory diagnosis. Prevention. Declaration of the World Health Organization: the world «smallpox-free».
14. Retroviruses. Human Immunodeficiency viruses (HIV). General characteristics. Acquired Immune Deficiency Syndrome (AIDS). Epidemiology. Pathogenesis. Clinical stages of HIV infection. Laboratory Diagnosis. Treatment. Immunoprophylaxis.
15. Picornaviruses. Classification. General characteristics. Biological properties. Antigens. Role in human’s pathology. Coxsackieviruses. Echoviruses. Epidemiology. Pathogenesis and clinical disease. Laboratory diagnosis. Treatment. Prevention. Newer enteroviruses.
16. Rhabdoviruses. General properties. Rabies. Epidemiology. Pathogenesis and clinical disease. Treatment. Control and prevention.
17. Orthomyxoviruses. The influenza viruses. Structure. Classification. Pathogenesis and immunity of influenza virus infection. Nospesific and specific defense mechanisms of anti influenza immunity, Treatment, prevention, and control. Severe acute respiratory syndrome (SARS).
18. 3. Polioviruses. Classification. General characteristics. Poliomyelitis. Epidemiology. Pathogenesis. Immunity. Clinical disease. Laboratory diagnosis. Prevention.
19. Hepatitis viruses. Classification. Hepatitis B virus. General properties. Associated antigens. Epidemiology. Pathogenesis and clinical disease. Laboratory diagnosis. Treatment. Prevention: passive and active immunization.
20. Arboviruses. Classification. Main families and genera of Arboviruses. General characteristics. Pathogenesis of arbovirus infections. Yellow fever. Dengue fever. Encephalitis. Viruses assoeiated with hemorrhagic fever. Filoviruses (the Marburg virus and the Ebola virus). Arenaviruses (the Lasse fever virus). General properties. Epidemiology. Pathogenesis and clinical diseases. Laboratory diagnosis. Control and prevention.
21. Herpesviruses. Classification. General characteristics. Herpes simplex virus. Varicella-Zoster virus. Epstein-Barr virus. Cytomegalovirus. Epidemiology. Pathogenesis and clinical syndromes of herpesvirus infections. Laboratory diagnosis. Treatment and immunoprophylaxis.
22. Hepatitis viruses. Classification. Hepatitis C virus (HCV), hepatitis D virus (HVD), hepatitis G virus (HGV) and other. Pathogenesis and clinical disease. Immunity. Laboratory diagnosis. Treatment and prevention.
23. Hepatitis viruses. Classification. Hepatitis A virus (HAV). Hepatitis E virus (HEV). General characteristics. Epidemiology. Pathogenesis and clinical disease. Laboratory diagnosis of hepatitis A and hepatitis E. Immunity. Treatment. Prevention.
24. Circoviridae. Classification. Hepatitis TT and SEN. Epidemiology. Pathogenesis. Clinical syndroms. Laboratory diagnosis. Treatment. Prevention.
25. The family Picornaviridae. Cardioviruses. Epidemiology. Pathogenesis. Clinical syndroms. Laboratory diagnosis. Treatment. Prevention.
26. The family Picornaviridae, Rhinoviruses. Epidemiology, Clinical syndroms. Laboratory diagnosis. Treatment. Prevention.
27. Oncogenic viruses. General principles of viral oncogenesis. Proviruses and oncogenes. Mechanism of malignant transformation. DNA tumor viruses. RNA tumor viruses. Identifying viral oncogenic behavior.
28. Prions and slow virus diseases (prion diseases). Structure of cellular and scrapie prion proteins. Resistance to physico-chemical factors. Functions of cellular prion protein. Pathogenic characteristics of scrapie prion protein. Model for proliferation of prions. Epidemiology, pathogenesis and clinical syndromes of prion diseases. Laboratory diagnosis. Treatment, prevention, and control.

**The list of practical skills and tasks to the concluding class № 5**

**for students of speciality «General medicine»**

* + - 1. Explain the virological diagnosis of influenza. Interpret the results of haemagglutination test (HAT) for detection of the virus. Make a conclusion about the presence of the virus.
      2. Explain the virological diagnosis of influenza. Interpret the results of hemagglutination inhibition test (HAIT) for serological identification of the isolated virus. Make a conclusion about the type of virus.
      3. Perform serological diagnosis of influenza. Interpret the results of hemagglutination inhibition test (HAIT) with paired sera of patient. Make a reasonable conclusion.
      4. Explain the virological diagnosis of polio. Identify the virus in cell culture infected by patient’s material according to the cytopathogenic effect (CPE) and the phenomenon of plaque. Make a conclusion.
      5. Explain the virological diagnosis of polio. Interpret the results of neutralization test (NT) for serological identification of virus isolated from a patient. Make a conclusion about the type of virus.
      6. Perform microscopy of a preparation of brain tissue to identify cells with Babes-Negri bodies.
      7. Explain the reaction of enzyme immunoassay. Interpret the results of ELISA for the serological diagnosis of HIV-infection.
      8. Name drugs for specific prevention and treatment of influenza and explain purpose of their use.
      9. Name drugs for specific prevention and treatment of herpes virus infection, explain purpose of their use.
      10. Name drugs for specific prevention of rabies and explain purpose of their use.
      11. Name drugs for specific prevention of arbovirus infections, explain purpose of their use.
      12. Name drugs for specific prevention of measles, rubella and mumps, explain purpose of their use.
      13. Name drugs for specific prevention of viral hepatitis and explain purpose of their use.
      14. Name drugs for the treatment of HIV-infection and AIDS, explain purpose of their use.

**THE LIST OF THEORETICAL QUESTIONS TO THE CONCLUDING LESSON №1**

**FOR STUDENTS OF DENTISTRY FACULTY**

# GENERAL BACTERIOLOGY

***1.*** Stages in the development of the science of microbiology, its branches. Medical microbiology, its definition. The contribution made by by R. Koch and L. Pasteur in the science of microbiology. Significance of microbiology in the practical work of the doctor.

***2.*** Achievements of the science of microbiology, modern methods of researches in bacteriology and immunology. Tasks of the science of microbiology at the modern stage. Contribution of Ukrainian scientists into the development of microbiology.

***3.*** Original methods of microbiological studies. Significance of microscopy in microbiological studies. Oil immersion lenses.

***4.*** Origin and evolution of microorganisms. Modern classification of procaryotes. Main taxons. Species as the main taxonomic unit.

***5.*** Morphology and structure of bacteria. Role of separate structures in vital activity of bacteria and pathogenesis of infectious diseases. Peculiarities in the morphology and structure of the eucaryotic and procaryotic cells.

***6.*** Stains used in microbiology; principles for preparation of staining solutions. Simple and complex methods of staining. Gram staining; theories that explain the mechanism of Gram staining. Properties of Gram-positive and Gram-negative microorganisms.

***7.*** Pure cultures of microorganisms, their significance for the theory and practice of microbiology. Principles of isolation and identification of pure cultures.

***8.*** Methods of cultivation and isolation of anaerobic bacteria.

***9.*** Influence of physical, chemical and biological factors on microorganisms. Methods of sterilization, control over sterilization.

***10.*** Metabolism of microorganisms. Nutrition and respiration of microorganisms. Types of nutrition in microorganisms. Culture media, their classification and requirements to them.

***11.*** Enzymes of microorganisms, their role in the metabolism. Use for differentiation of bacteria. Enzymes of pathogenicity.

***12.*** Growth and multiplication of microorganisms. Phases of multiplication in stationary conditions.

***13.*** Genetics of microorganisms. Organization of the genetic apparatus of bacteria. Genotypical and phenotypical variability of microorganisms, its practical significance. Dissociation in bacteria.

***14.*** Extrachromosomal factors of heredity in bacteria. Plasmids, their properties. Migratory genetic elements.

***15.*** Genetic recombinations.

# INFECTION AND IMMUNITY

***16.*** The role of microorganisms in the development of the infectious process. Pathogenicity, virulence, units of measurement, ways of determination. Factors of pathogenicity of microorganisms.

***17.*** The role of the macroorganism in the development of the infectious process. Influence of environment and social conditions on appearance and development of the infectious process in man. Infection atrium. Forms of the infectious process. Bacteriemia, cepticemia, virusemia. Carriage of bacteria.

***18.*** Toxins of microorganisms, their properties. The role in pathogenesis and immunogenesis of infectious diseases, measurement of the power of an exotoxin.

***19.*** Antitoxins, their obtaining, purification, units of measurement, use.

***20.*** Teaching on immunity. Modern determination of the notion of "immunity". Types of immunity and forms of its manifestation.

***21.*** Nonspecific factors of organism protection against pathogenic microbes.

Phagocytosis, types of phagocyting cells. Stages of phagocytosis. Complete and incomplete phagocytosis. Value of phagocytosis in insusceptibility of the macroorganism to infectious diseases.

***22.*** Complement, its properties, ways of activation.

***23.*** Antigens. Complete and incomplete antigens. Antigenic structure of bacteria. Practical value of teaching on antigens of microorganisms. Autoantigens.

***24.*** Antibodies, their nature, chemical structure, place of synthesis, dynamics in the production of antibodies. Autoantibodies. Monoclonal antibodies, their use.

***25.*** Classes of immunoglobulins, their physico-chemical characteristics, active centres of antibodies. Complete and incomplete antibodies.

***26.*** Serological reactions, their characteristics and main types. Reactions of agglutination and precipitation, mechanisms of the reactions. Practical use.

***27.*** The hemagglutination-inhibition test, its mechanism, conditions of execution, principles of use, diagnostic value.

***28.*** Reactions with labeled antibodies and antigens. The essence and practical use of the immune fluorescence reaction, enzyme-labeled antibody reaction, radioimmune analysis.

***29.*** The immune system of the macroorganism, its organs. Cells of the immune system, their varieties, interaction and role in the immune response.

***30.*** Regularities of the immune response of the organism. Phases of the immune response. Immunological memory and its mechanism.

***31.*** Delayed and immediate hypersensitivities, their mechanisms, peculiarities, practical use, significance.

***32.*** The notion of chemotherapy and chemotherapeutic preparations. Chemotherapeutic index. Mechanism of the antibacterial action of sulphanylamides. The role of P. Erlich and G. Domagk in the development of the teaching on chemotherapy.

***33.*** The phenomenon of antagonism in microbes. Antibiotics, their definition, classification of antibiotics by the mechanism of their effect on microorganisms.

***34.*** Antibiotics, history of discovery, principles of obtaining, units of measurement, mechanism of action, use. Contribution made by Ukrainian scientists-microbiologists into the development of teaching on antibiotics.

***35.*** Drug resistance of microbes. Its mechanism. Methods for determination of sensitivity of microorganisms to antibiotics. Minimum inhibitory concentration, its practical value. Principles of struggle with drug resistance of microorganisms.

***36.*** Immune sera, their clasification. Principles of obtaining, units of measurement, control. Practical use.

***37.*** Modern classification of vaccines. Vaccines from live and killed microorganisms. Toxoids. Principles of obtaining, control. Practical use in medicine.

***38.*** Chemical vaccines. Principles of their obtaining and control, use. Combined vaccines.

***39.*** Recombinated vaccines, principles of their obtaining, control. Practical use.

**THE LIST OF PRACTICAL SKILLS AND TASKS TO THE CONCLUDING LESSON №1**

**FOR STUDENTS OF DENTISTRY FACULTY**

1. Prepare the smear from mixture of microorganisms for finding of bacteria of different species.
2. Stain the smear, prepared from suspension of microbs, using the Gram method.
3. Prepare the smear from mixture of microorganisms and stain it by methylene blue.
4. Sterilize loop in the bunsen flame.
5. Stain the smear, prepared from suspension of microbs, using the Romanowsky-Giemsa method.
6. Stain the smear, prepared from suspension of microbs, using Ziehl-Neelsen method.
7. Prepare the smear from mixture of microorganisms and stain it by watery solution of fuchsin.
8. Take into account and estimate result of compliment fixation test for serodiagnosis.
9. Make inoculation of microorganisms in solid nutrient medium from the clinical specimen by tampon.
10. Determine microorganisms by morphologic features in microbiologic specimen.
11. Make inoculation of microorganisms in semiliquid nutrient medium from the clinical specimen by loop.
12. Make inoculation of microorganisms in semiliquid nutrient medium from the clinical specimen by pipette.
13. Determine microorganism by morphologic features in microbiologic specimen.
14. Take into account and estimate result of slide agglutination test.
15. Make inoculation of microorganisms in semiliquid nutrient medium from the clinical specimen by pipette.
16. Take into account and estimate result of determination of susceptibility of pathogenic bacteria to antibiotics by the disc diffusion method.
17. Take into account and estimate result of agglutination test.
18. Take into account and estimate result of precipitation reaction.