

**МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ**  
**УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ**  
**«ГОМЕЛЬСКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ»**

**Кафедра микробиологии, вирусологии и иммунологии**

**МЕДИЦИНСКАЯ МИКРОБИОЛОГИЯ,  
ВИРУСОЛОГИЯ И ИММУНОЛОГИЯ.  
СБОРНИК ТЕСТОВЫХ ЗАДАНИЙ**

**Учебно-методическое пособие  
для иностранных студентов 2–3 курсов  
учреждений высшего медицинского образования,  
обучающихся на английском языке  
по специальности 1-79 01 01 «Лечебное дело»**

**MEDICAL MICROBIOLOGY,  
VIROLOGY AND IMMUNOLOGY.  
COLLECTION OF TEST TASKS**

**Course material aid  
for the 2nd and 3rd year foreign students  
of higher medical educational institutions  
studying in the specialty 1-79 01 01 “General Medicine”**

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М46

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## LIST OF ABBREVIATIONS

Ag	– antigen
BCG	– Bacillus Calmette – Guérin
CD	– cluster of differentiation
CH	– constant domain of the antibody heavy chain
CFT	– complement fixation test
CL	– constant domain of the light chain
CNS	– central nervous system
CFU	– colony forming unit
ds	– double-stranded
DIC	– differential interference contrast microscopy
DNA	– deoxyribonucleic acid
DTP vaccine	– the diphtheria, tetanus, and pertussis vaccine
ECHO viruses	– enteric cytopathogenic human orphan viruses
ELISA	– the enzyme-linked immunosorbent assay
Fc fragment	– fragment crystallizable region of antibody
HIV	– human immunodeficiency virus
HLA	– human leukocyte antigen
IFA	– immunofluorescence assay
IFN	– interferon
Ig	– immunoglobulin
IL	– interleukin
LPS	– lipopolysaccharide
MHC	– major histocompatibility complex
MPA	– meat-peptone agar
MPB	– meat-peptone broth
NK cells	– natural killer cells
PCR	– polymerase chain reaction
RH	– rhesus
RIA	– radioimmunoassay
RIHA	– reaction of inhibition of hemagglutination
RNA	– ribonucleic acid
ss	– single-stranded
Th cell	– T-helper cell
TNF	– tumor necrosis factor

## INTRODUCTION

Course material aid “Medical microbiology, virology and immunology. Collection of test tasks” is intended for self-preparation of 2<sup>nd</sup> and 3<sup>rd</sup> year students of higher medical educational institutions studying in the specialty 1-79 01 01 “General Medicine” for the classes in “Microbiology, virology, immunology”. The collection of test tasks is compiled according to the program of practical and lecture classes in the following chapters “Morphology, physiology and genetics of microorganisms”, “General infectology. Theoretical and practical medical immunology”, “Medical bacteriology, mycology and protozoology”, “General and practical medical virology” and includes 1000 tests, answer keys and a list of recommended references. While preparing to the classes, the training material should be revised according to the sources indicated in the list of references. To consolidate the material and control the level of training in the relevant sections of the discipline, it is necessary to perform the test tasks. There are five possible answers for each question, one of which is correct. One can check the correctness of the test tasks according to the table given at the end of each section. This will allow to identify difficult questions to learn. After revising the training material, it is advisable to complete the tasks until the correct answer is received.

# CHAPTER 1

## HISTORICAL STAGES. MORPHOLOGY, PHYSIOLOGY AND GENETICS OF MICROORGANISMS

*Choose one correct answer*

***1. Scientists known as founders of the physiological period of microbiology development are...***

*Variants of answer:*

- a) A. van Leeuwenhoek, I. I. Mechnikov;
- b) L. Pasteur, R. Koch;
- c) L. A. Silber, H. M. Temin;
- d) M. P. Chumakov, A. A. Smorodintsev;
- e) D. I. Ivanovsky, N. A. Krasilnikov.

***2. Scientists known as founders of immunology are...***

*Variants of answer:*

- a) I. I. Mechnikov, P. Ehrlich;
- b) L. Pasteur, E. Jenner;
- c) L. A. Silber, H. M. Temin;
- d) R. Koch, A. van Leeuwenhoek;
- e) D. I. Ivanovsky, N. A. Krasilnikov.

***3. The discoverer of microbes is...***

*Variants of answer:*

- a) Hippocrates;
- b) Lucretius;
- c) A. van Leeuwenhoek;
- d) L. Pasteur;
- e) R. Koch.

***4. The method of preventive vaccinations against smallpox virus was first developed by...***

*Variants of answer:*

- a) L. Pasteur;
- b) E. Jenner;
- c) A. Leeuwenhoek;
- d) Hippocrates;
- e) R. Koch.

***5. The discovery of the causative agent of tuberculosis belongs to...***

*Variants of answer:*

- a) R. Koch;

- b) I. I. Mechnikov;
- c) F. Loeffler;
- d) L. Pasteur;
- e) N. A. Krasilnikov.

**6. The phagocytic theory of immunity belongs to...**

*Variants of answer:*

- a) D. I. Ivanovsky;
- b) N. F. Gamaleya;
- c) I. I. Mechnikov;
- d) S. N. Vinogradsky;
- e) R. Koch.

**7. The discovery of the fermentation, vaccines and methods of chicken cholera prevention, anthrax and rabies is associated with the name of the scientist...**

*Variants of answer:*

- a) A. van Leeuwenhoek;
- b) I. I. Mechnikov;
- c) R. Koch;
- d) L. Pasteur;
- e) D. I. Ivanovsky.

**8. Task of the bacterioscopic research method is...**

*Variants of answer:*

- a) to obtain a pure culture of microorganisms in artificial nutrient media;
- b) to study the morphology of microorganisms using a microscope;
- c) to reproduce a model of the infectious process in laboratory animals;
- d) to identify microbial antigens using specific immune serums;
- e) to identify the DNA of the causative agent of the infectious process in a sample of biological material.

**9. The resolving power of a light microscope with an immersion system is equal to...**

*Variants of answer:*

- a) 200  $\mu\text{m}$ ;
- b) 0.2  $\mu\text{m}$ ;
- c) 0.02  $\mu\text{m}$ ;
- d) 20  $\mu\text{m}$ ;
- e) 0.2  $\mu\text{m}$ .

**10. The resolution of a light microscope is...**

*Variants of answer:*

- a) the ability to give a separate image of two closely spaced points;

- b) the ability to observe the movement of the object;
- c) the ability to determine the size of the object;
- d) refractive index of the immersion system;
- e) the object's magnification indicator.

**11. The microscopic method studies the following property of bacteria:**

*Variants of answer:*

- a) morphological property;
- b) cultural property;
- c) antigenic property;
- d) biochemical property;
- e) sensitivity to antibiotics.

**12. The optical part of the light microscope includes everything except...**

*Variants of answer:*

- a) the condenser;
- b) lens;
- c) eyepiece;
- d) tube;
- e) the collector.

**13. The magnification of the light microscope is equal to...**

*Variants of answer:*

- a) the product of the magnification of the lens and the magnification of the eyepiece;
- b) the difference between the magnification of the lens and the eyepiece;
- c) the sum of magnifications of the lens and eyepiece;
- d) magnification of the lens;
- e) magnification of the eyepiece.

**14. To study the mobility of bacteria in the "hanging drop" preparation, the following type of microscopy is used:**

*Variants of answer:*

- a) luminescent microscopy;
- b) immersion microscopy;
- c) dark-field microscopy;
- d) electronic microscopy;
- e) all the mentioned variants.

**15. To study the ultrastructure of bacteria and viruses, the following type of microscopy is used:**

*Variants of answer:*

- a) luminescent microscopy;

- b) electronic microscopy;
- c) dark-field microscopy;
- d) phase-contrast microscopy;
- e) immersion microscopy.

**16. Choose the microbial taxonomic unit corresponding to domain level:**

*Variants of answer:*

- a) protozoa;
- b) fungi;
- c) bacteria;
- d) proteobacteria;
- e) chlamydia.

**17. Polyphasic taxonomy is based on...**

*Variants of answer:*

- a) phylogenetic relationships among bacterial groups;
- b) genetic analysis of bacteria including DNA – DNA hybridization and ribotyping;
- c) specific protein and enzyme patterns of bacteria;
- d) specified number of phenotypic traits;
- e) all the mentioned variants.

**18. Current method providing classification of bacteria at genus or family rank is...**

*Variants of answer:*

- a) DNA – DNA hybridization;
- b) ribotyping;
- c) microscopy with differential staining;
- d) identification of chemical composition of bacteria (chemotaxonomic markers);
- e) full description of expressed features (morphology and physiology, antigenic structure of bacteria, etc.).

**19. Vaccine created by L. Pasteur is used...**

*Variants of answer:*

- a) against tuberculosis;
- b) against influenza;
- c) against plague;
- d) against rabies;
- e) against plague.

**20. Genle – Koch's triad formulates...**

*Variants of answer:*

- a) conditions for epidemic process development;

- b) basic principles that prove infectious origin of the disease;
- c) basic principles of asepsis;
- d) principles of laboratory testing in microbiology;
- e) basic three-domain organization of microbial world.

**21. Highest taxonomic rank from listed below is...**

*Variants of answer:*

- a) order;
- b) class;
- c) family;
- d) genus;
- e) pathovar.

**22. Bacterial strain is...**

*Variants of answer:*

- a) population of bacteria of the same species inhabiting common area;
- b) population of bacteria that exert the same pathology;
- c) population of bacteria of the same species isolated from various sources;
- d) population of bacteria of the same species isolated from various sources or from the same source at different periods of time;
- e) population of bacteria with closely similar genomic features.

**23. Biovar of bacteria means...**

*Variants of answer:*

- a) group of bacteria sharing certain biochemical features with other bacteria;
- b) bacteria with common metabolic pathways;
- c) group of certain species bacteria with common special biochemical or physiologic properties;
- d) bacteria living in the same biotope;
- e) various bacteria forming common biofilm.

**24. Resolving power of light microscope is determined by...**

*Variants of answer:*

- a) wavelength of light;
- b) light wave frequency;
- c) refraction index of medium;
- d) wavelength of light carrier and numeric aperture of objective lens;
- e) overall magnification of objective and ocular lenses.

**25. Microscopical technique providing the formation of 3D-like relief image of cells is...**

*Variants of answer:*

- a) bright-field microscopy;
- b) dark-field microscopy;

- c) fluorescent microscopy;
- d) phase-contrast microscopy;
- e) DIC microscopy.

**26. Light microscopical technique for real-time observation of living bacteria is...**

*Variants of answer:*

- a) phase-contrast microscopy;
- b) bright-field transmission light microscopy – simple staining;
- c) bright-field microscopy – differential staining;
- d) transmission electron microscopy;
- e) scanning electron microscopy.

**27. The taxonomic group(s) of microorganisms not presented in domain organization is (are) ...**

*Variants of answer:*

- a) vira;
- b) bacteria;
- c) archaea;
- d) eucarya;
- e) all the mentioned variants.

**28. Numerical taxonomy is primarily based on...**

*Variants of answer:*

- a) morphology of bacteria;
- b) multiple biochemical markers;
- c) sequencing of bacterial genomes;
- d) antigenic structure;
- e) computer-assisted analysis of all traits of bacterial population.

**29. Current method providing classification of bacteria on species level is...**

- a) electron microscopy;
- b) identification of chemical composition of bacteria (chemotaxonomic markers);
- c) full description of expressed features of bacteria (morphology and physiology, antigenic structure, etc.);
- d) DNA – DNA hybridization;
- e) ribotyping.

**30. Pandemic bacterium discovered by R. Koch is...**

*Variants of answer:*

- a) *Streptococcus pyogenes*;
- b) *Neisseria gonorrhoea*;

- c) *Corinebacterium diptheriae*;
- d) *Vibrio cholerae*;
- e) *Yersinia (Y.) pestis*.

**31. Choose incorrect statement.**

*Variants of answer:*

- a) Paul Ehrlich was the first who introduced chemical drugs for infectious disease treatment;
- b) Ilya Mechnikov discovered phagocytosis;
- c) Alexander Fleming discovered sulfonamides;
- d) Ignaz Semmelweis formulated first principles of asepsis;
- e) Joseph Lister demonstrated high efficacy of antiseptics in prevention of wound infections.

**32. All the listed below features are essential ones for species in bacteria except...**

*Variants of answer:*

- a) common origin;
- b) evolutionarily stable genomic organization;
- c) genomic DNA relatedness at 70% or more;
- d) similar or common area of habitation;
- e) similar properties.

**33. Pathovar of bacteria means...**

*Variants of answer:*

- a) various bacteria isolated from patients with certain disease;
- b) various bacteria producing similar toxins or other virulence factors;
- c) degraded morphological form of bacteria;
- d) bacteria of the same species with equal spectra of antibiotic resistance;
- e) bacteria of the same species demonstrating equal pathogenic properties for certain hosts.

**34. Total magnification of light microscopes is calculated as...**

*Variants of answer:*

- a) magnification of objective lens multiplied by magnification of eyepiece lens;
- b) magnification of objective lens multiplied by magnification of condenser and eyepiece lens;
- c) overall magnification of objective and eyepiece lenses divided by focal length;
- d) total sum of objective, eyepiece and condenser lens magnifications;
- e) total sum of objective and eyepiece lenses multiplied by power coefficient of light source.

**35. Microscopical technique that creates true 3D-image of bacteria is...**

*Variants of answer:*

- a) DIC microscopy;
- b) laser scanning confocal microscopy;
- c) fluorescent microscopy;
- d) phase-contrast microscopy;
- e) electron microscopy.

**36. Microscopical technique providing real-time analysis of microbial surface on nanoscale level is...**

*Variants of answer:*

- a) atomic force microscopy;
- b) transmission electron microscopy;
- c) DIC microscopy;
- d) laser scanning confocal fluorescent microscopy;
- e) immune fluorescent microscopy.

**37. Microscopical technique with highest resolving power is...**

*Variants of answer:*

- a) DIC microscopy;
- b) scanning electron microscopy;
- c) transmission electron microscopy;
- d) laser scanning confocal microscopy;
- e) fluorescent microscopy.

**38. Obligate structure of bacterial cell is...**

*Variants of answer:*

- a) spore;
- b) cell wall;
- c) nucleoid;
- d) flagella;
- e) granules of volutin.

**39. Non-obligate structure of bacterial cell is...**

*Variants of answer:*

- a) spore;
- b) ribosome;
- c) cytoplasm;
- d) nucleoid;
- e) cytoplasmic membrane.

**40. A method of studying of bacterial morphology is...**

*Variants of answer:*

- a) inoculation into solid medium;

- b) serological testing;
- c) genetic identification;
- d) preparation of smears with simple method of stain;
- e) biochemical reactions.

**41. The mechanism of penicillin action is...**

*Variants of answer:*

- a) termination of nucleoid replication;
- b) prevention of capsule synthesis;
- c) osmotic shock;
- d) impairment of cell wall synthesis due to transpeptidase inhibition;
- e) dampening of protein synthesis.

**42. Organelles of bacterial locomotion are...**

*Variants of answer:*

- a) pili;
- b) spores;
- c) plasmids;
- d) mesosomes;
- e) flagella.

**43. Structures for bacteria adhesion are...**

*Variants of answer:*

- a) permeases;
- b) mesosomes;
- c) fibrils;
- d) pili;
- e) plasmids.

**44. Spore-forming microorganisms are...**

*Variants of answer:*

- a) spirochetes;
- b) clostridia;
- c) staphylococci;
- d) pseudomonads;
- e) mycobacteria.

**45. Morphology of streptococci is...**

*Variants of answer:*

- a) chains of cocci;
- b) paired cocci;
- c) tetrad-forming cocci;
- d) cocci lying separately from each other;
- e) grapes-like cocci.

**46. Structure for long conservation of a microbial cell in the environment is...**

*Variants of answer:*

- a) cell wall;
- b) LPS;
- c) spore;
- d) capsule;
- e) cytoplasmic membrane.

**47. The factor of pathogenicity of Gram-negative bacteria is...**

*Variants of answer:*

- a) flagella;
- b) nucleoid;
- c) spore;
- d) lipid A;
- e) inner membrane.

**48. Structure for protection of bacterial cells against macrophages is...**

*Variants of answer:*

- a) flagella;
- b) cytoplasmic membrane;
- c) granules of volutin;
- d) capsule;
- e) ribosomes.

**49. A method for acid-fast bacilli stain is...**

*Variants of answer:*

- a) Gram method;
- b) Neisser method;
- c) Ziehl – Neelsen method;
- d) Romanowsky – Giemsa method;
- e) acridine orange staining.

**50. A method for staining of volutin granules is...**

*Variants of answer:*

- a) Gram method;
- b) Neisser method;
- c) Ziehl – Neelsen method;
- d) Romanowsky – Giemsa method;
- e) fuchsin staining.

**51. The round (spherical) forms of bacteria are...**

*Variants of answer:*

- a) bacilli;

- b) mycobacteria;
- c) clostridia;
- d) spirochetes;
- e) diplococci.

**52. Spiral forms of microorganisms are...**

*Variants of answer:*

- a) bacilli;
- b) spirochetes;
- c) staphylococci;
- d) actinomycetes;
- e) mycobacteria.

**53. Spore-forming microorganisms are...**

*Variants of answer:*

- a) bacilli;
- b) spirochetes;
- c) staphylococci;
- d) bacteroids;
- e) mycobacteria.

**54. Morphology of staphylococci is...**

*Variants of answer:*

- a) chains of cocci;
- b) paired cocci;
- c) tetrad-forming cocci;
- d) cocci lying separately from each other;
- e) grapes-like cocci.

**55. Rod-shaped forms of microorganisms are...**

*Variants of answer:*

- a) bacilli;
- b) spirochetes;
- c) staphylococci;
- d) actinomycetes;
- e) borrelia.

**56. Filamentous or branched forms of microorganisms are...**

*Variants of answer:*

- a) bacilli;
- b) vibrios;
- c) streptococci;
- d) actinomycetes;
- e) clostridia.

**57. A component of bacterial envelope is...**

*Variants of answer:*

- a) flagella;
- b) nucleoid;
- c) spore;
- d) pili;
- e) cell wall.

**58. L-form of bacteria means...**

*Variants of answer:*

- a) bacteria without capsule;
- b) lamellar bacterial form;
- c) non-replicating dormant bacteria;
- d) LPS-containing bacteria;
- e) bacteria without cell wall that are able to self-replication.

**59. Component of envelope presented only in Gram-positive bacteria is...**

*Variants of answer:*

- a) inner membrane;
- b) peptidoglycan;
- c) LPS;
- d) teichoic acids;
- e) outer membrane.

**60. Obligate intracellular parasites are...**

*Variants of answer:*

- a) mycoplasmas;
- b) actinomycetes;
- c) chlamydiae;
- d) spirochetes;
- e) vibrios.

**61. Microorganisms without cell wall are...**

*Variants of answer:*

- a) rickettsiae;
- b) mycoplasmas;
- c) chlamydiae;
- d) spirochetes;
- e) staphylococci.

**62. The following property is typical for fungi:**

*Variants of answer:*

- a) presence of nucleus;

- b) presence of nucleoid;
- c) presence of flagella;
- d) presence of teichoic acids;
- e) absence of cell wall.

**63. Reproduction by means of spores is typical for...**

*Variants of answer:*

- a) rickettsiae;
- b) chlamydiae;
- c) fungi;
- d) mycoplasmas;
- e) bacilli.

**64. Organelles of spirochetes locomotion are...**

*Variants of answer:*

- a) injectisomes;
- b) fibrillas;
- c) mesosomes;
- d) pili;
- e) cytoplasmic protrusions.

**65. Representatives of spiral microbial forms are...**

*Variants of answer:*

- a) actinomycetes;
- b) borrelia;
- c) mycoplasmas;
- d) chlamydiae;
- e) fungi.

**66. The sexual method of reproduction is typical for...**

*Variants of answer:*

- a) treponema;
- b) actinomycetes;
- c) ascomycetes;
- d) chlamydiae;
- e) mycoplasmas.

**67. Beta-lactam antibiotics don't inhibit...**

*Variants of answer:*

- a) mycoplasmas;
- b) rickettsiae;
- c) meningococci;
- d) treponema;
- e) borrelia.

**68. Pseudo-mycelium (pseudohyphae) is formed by...**

*Variants of answer:*

- a) ascomycetes;
- b) basidiomycetes;
- c) candidae;
- d) actinomycetes;
- e) mycoplasmas.

**69. A method of stain for spirochetes is...**

*Variants of answer:*

- a) Romanovsky – Giemsa method;
- b) Ozheshko method;
- c) Gins method;
- d) Ziehl – Neelsen method;
- e) Gram method.

**70. Ascus can be present in...**

*Variants of answer:*

- a) Mucor;
- b) Penicillium;
- c) Microsporum;
- d) basidiomycetes;
- e) Trichophyton.

**71. Obligate intracellular parasites are...**

*Variants of answer:*

- a) staphylococci;
- b) mycoplasmas;
- c) rickettsiae;
- d) spirillas;
- e) spirochetes.

**72. Essential part of envelope in mycoplasmas is...**

*Variants of answer:*

- a) capsule;
- b) peptidoglycan;
- c) LPS;
- d) cell wall;
- e) cytoplasmic membrane.

**73. Microorganisms with nucleus are...**

*Variants of answer:*

- a) actinomycetes;

- b) spore-forming bacilli;
- c) chlamydiae;
- d) mycoplasmas;
- e) yeasts.

**74. Fungi are reproduced by...**

*Variants of answer:*

- a) nucleoid;
- b) nucleosomes;
- c) conidia;
- d) mesosomes;
- e) sterigmata.

**75. Cholesterol is essential for growth of...**

*Variants of answer:*

- a) rickettsiae;
- b) mycoplasmas;
- c) clostridia;
- d) chlamydiae;
- e) fungi.

**76. A method of reproduction that is absent in deuteromycetes is...**

*Variants of answer:*

- a) budding;
- b) fragmentation;
- c) sexual method;
- d) asexual method;
- e) sporogenesis.

**77. Representatives of twisted (spiral) forms of bacteria are...**

*Variants of answer:*

- a) rickettsiae;
- b) mycoplasmas;
- c) syphilis agents;
- d) chlamydiae;
- e) sarcinas.

**78. A method for rickettsia cultivation is...**

*Variants of answer:*

- a) basic nutrient media;
- b) complex nutrient media;
- c) special medium;
- d) Sabouraud agar;
- e) cell culture.

**79. Motile forms of microorganisms are...**

*Variants of answer:*

- a) staphylococci;
- b) chlamydiae;
- c) rickettsiae;
- d) spirochetes;
- e) bacilli.

**80. A method for detection of spirochetes motility is...**

*Variants of answer:*

- a) Romanovsky – Giemsa stain;
- b) dark-field microscopy;
- c) luminescent microscopy;
- d) electron microscopy;
- e) Gram stain.

**81. Non-fungal disease is...**

*Variants of answer:*

- a) actinomycosis;
- b) aspergillosis;
- c) favus;
- d) microsporosis;
- e) candidiasis.

**82. The mechanism of group translocation is used in...**

*Variants of answer:*

- a) respiration;
- b) reproduction;
- c) trans-membrane transportation;
- d) growth;
- e) sporulation.

**83. The sources of carbon for autotrophs are...**

*Variants of answer:*

- a) proteins;
- b) carbohydrates;
- c) carbon dioxide;
- d) lipids;
- e) vitamins.

**84. Bacteria that need growth factors for reproduction are called...**

*Variants of answer:*

- a) organotrophs;
- b) heterotrophs;

- c) chemotrophs;
- d) auxotrophs;
- e) lithotrophs.

**85. Nutrient media providing the isolation of bacteria in pure culture are ...**

*Variants of answer:*

- a) simple nutrient media;
- b) complex nutrient media;
- c) selective nutrient media;
- d) synthetic nutrient media;
- e) differential nutrient media.

**86. Method for simple nutrient media sterilization is ...**

*Variants of answer:*

- a) pasteurization;
- b) tyndallization;
- c) boiling;
- d) autoclaving;
- e) irradiation.

**87. Division of bacteria based on the source of carbon is ...**

*Variants of answer:*

- a) heterotrophs;
- b) phototrophs;
- c) organotrophs;
- d) chemotrophs;
- e) lithotrophs.

**88. Anabolism implies ...**

*Variants of answer:*

- a) adenosine triphosphate (ATP) synthesis;
- b) degradation of biopolymers;
- c) energy release;
- d) peptide chain elongation;
- e) hydrolysis of macromolecules.

**89. Asepsis means:**

*Variants of answer:*

- a) eradication of pathogenic microorganisms in the environment by chemical compounds;
- b) elimination of the invaded microbes from the body;
- c) termination of bacterial and fungal growth in wounds with chemical substances;

- d) treatment of sepsis;
- e) complex of measures, preventing microbial contamination of any object, including instruments, dressing material, linen, wound surfaces, etc.

**90. Symport means...**

*Variants of answer:*

- a) nutrition process without energy consumption;
- b) mechanism of nutrition based on group translocation;
- c) simultaneous transportation of two substances in opposite directions;
- d) movement of bacterial cells in the same direction;
- e) parallel transportation of two substances in the same direction.

**91. One of the most efficient and well-tolerated antiseptics is...**

*Variants of answer:*

- a) chlorhexidine;
- b) formaldehyde;
- c) phenol;
- d) boric acid;
- e) chloroform.

**92. Catabolism provides for microorganisms...**

*Variants of answer:*

- a) protein synthesis;
- b) any macromolecule synthesis;
- c) ATP accumulation;
- d) supply with growth factors;
- e) nucleoid replication.

**93. The sources of carbon for heterotrophs are...**

*Variants of answer:*

- a) proteins;
- b) carbohydrates;
- c) nucleic acids;
- d) lipids;
- e) all the mentioned variants.

**94. Division of bacteria according to energy source is called...**

*Variants of answer:*

- a) heterotrophs;
- b) autotrophs;
- c) auxotrophs;
- d) chemotrophs;
- e) lithotrophs.

**95. Nutrient medium for examination of biochemical properties of bacteria is...**

*Variants of answer:*

- a) MPA;
- b) MPB;
- c) Hiss media;
- d) ascite agar;
- e) gelatine.

**96. Type of trans-membrane transport without energy consumption is called...**

*Variants of answer:*

- a) facilitated diffusion;
- b) proton-motive force;
- c) symport;
- d) antiport;
- e) group translocation.

**97. Disinfection means...**

*Variants of answer:*

- a) elimination of vegetative microbial forms and their spores in various materials in high temperature;
- b) complex of measures for eradication of microbial species from objects in external environment by chemical compounds or physical methods;
- c) complete elimination of all microbial forms;
- d) killing of bacteria directly in the wounds by chemical substances;
- e) complex of measures for eradication of microbial pathogens from human body by chemical drugs or physical methods.

**98. Method of choice for sterilization of glassware is...**

*Variants of answer:*

- a) autoclaving;
- b) pasteurization;
- c) tyndallization;
- d) filtration;
- e) dry heat sterilization.

**99. Antiport means...**

*Variants of answer:*

- a) anti-microbial intervention dampening trans-membrane transportation in bacteria;
- b) nutrition of bacteria without energy consumption;
- c) simultaneous transportation of two substances in opposite directions;

- d) simultaneous transportation of two substances in the same direction;
- e) inhibition of bacterial motility.

**100. Basic nutrient medium is...**

*Variants of answer:*

- a) Endo medium;
- b) McConkey medium;
- c) MPA;
- d) Hiss medium;
- e) Sauton medium.

**101. Method of non-complete sterilization is...**

*Variants of answer:*

- a) autoclaving;
- b) gamma-irradiation;
- c) dry heat sterilization;
- d) boiling;
- e) tyndallization.

**102. Microbial pathogens passing across membranes under sterilization by filtration are...**

*Variants of answer:*

- a) viruses;
- b) bacteria;
- c) bacilli;
- d) protozoans;
- e) fungi.

**103. Bacteria cultured at low oxygen concentration are called...**

*Variants of answer:*

- a) aerotolerant bacteria;
- b) obligate anaerobes;
- c) facultative anaerobes;
- d) obligate aerobes;
- e) microaerophils.

**104. Obligate aerobes are...**

*Variants of answer:*

- a) staphylococci;
- b) spirillas;
- c) *Pseudomonas aeruginosa*;
- d) rickettsiae;
- e) enterobacteria.

**105. Obligate anaerobes are...**

*Variants of answer:*

- a) staphylococci;
- b) streptococci;
- c) clostridia;
- d) rickettsiae;
- e) mycoplasmas.

**106. Medium for strict anaerobes cultivation is...**

*Variants of answer:*

- a) ferric sulfite agar;
- b) MPA;
- c) MPB;
- d) Endo medium.
- e) Hiss medium.

**107. Essential trait of S-forms of colonies is...**

*Variants of answer:*

- a) serrations edges;
- b) smooth surface;
- c) flat surface;
- d) rough surface;
- e) presence of flagella.

**108. Bacteria that utilize oxygen as single final electron acceptor are...**

*Variants of answer:*

- a) aerotolerant bacteria;
- b) obligate anaerobes;
- c) facultative anaerobes;
- d) obligate aerobes;
- e) microaerophils.

**109. Bacteria reproduced by means of spores are...**

*Variants of answer:*

- a) Gram-negative bacteria;
- b) clostridia;
- c) spirochaetes;
- d) chlamydia;
- e) actinomycetes.

**110. Nitrate is final acceptor of electrons and protons for...**

*Variants of answer:*

- a) capnophils;

- b) obligate anaerobes;
- c) facultative anaerobes;
- d) obligate aerobes;
- e) microaerophils.

**111. Process during which the bacteria produce a single product of fermentation is called...**

*Variants of answer:*

- a) glycolysis;
- b) substrate phosphorylation;
- c) Entner – Doudoroff pathway;
- d) homofermentative process;
- e) heterofermentative process.

**112. Microaerophilic bacteria are...**

*Variants of answer:*

- a) staphylococci;
- b) *Escherichia coli*;
- c) clostridia;
- d) *Helicobacter pylori*;
- e) pseudomonads.

**113. Terminal enzymes in respiratory chain of strict aerobes are...**

*Variants of answer:*

- a) ubiquinones;
- b) catalases;
- c) dehydrogenases;
- d) reductases;
- e) cytochromes.

**114. Obligate anaerobes are...**

*Variants of answer:*

- a) staphylococci;
- b) streptococci;
- c) bacteroids;
- d) pseudomonads;
- e) bordetellae.

**115. Obligate aerobic bacterium is...**

*Variants of answer:*

- a) *Mycobacterium tuberculosis*;
- b) *Clostridium tetani*;
- c) *Treponema pallidum*;

- d) *Rickettsia provazekii*;
- e) *Bacteroides fragilis*.

**116. Method for anaerobes cultivation is...**

*Variants of answer:*

- a) in aerobic jar;
- b) in Pasteur chamber;
- c) in deep agar culture of Wilson – Blair medium;
- d) in Petri dish with MPA;
- e) in test tube with MPB.

**117. The process during which organic substances are the donors and acceptors of electrons and protons is called...**

*Variants of answer:*

- a) oxydative phosphorylation;
- b) fermentation;
- c) nitrate respiration;
- d) archaeobacterial respiration;
- e) catabolism.

**118. Type of bacterial reproduction is...**

*Variants of answer:*

- a) budding;
- b) binary fission;
- c) conjugation;
- d) mitosis;
- e) sexual reproduction.

**119. Essential trait of R-forms colonies is...**

*Variants of answer:*

- a) straight edges;
- b) smooth surface;
- c) flat surface;
- d) resistance to antibiotics;
- e) rough surface.

**120. The most beneficial pathway for energy gain in bacteria is...**

*Variants of answer:*

- a) Embden – Meyerhoff pathway;
- b) pentose monophosphate pathway;
- c) Entner – Doudoroff pathway;
- d) oxidative phosphorylation;
- e) substrate phosphorylation.

**121. Process during which bacteria produce several products of fermentation is called...**

*Variants of answer:*

- a) homofermentative process;
- b) heterofermentative process;
- c) glycolysis;
- d) substrate phosphorylation;
- e) oxidative phosphorylation.

**122. Facultative anaerobes are...**

*Variants of answer:*

- a) helicobacter;
- b) pseudomonas;
- c) escherichia;
- d) clostridia;
- e) brucella.

**123. The enzyme absent in obligate anaerobes is...**

*Variants of answer:*

- a) DNA polymerase;
- b) superoxide dismutase;
- c) permease;
- d) hyaluronidase;
- e) nitrate reductase.

**124. Substance that is toxic for anaerobic bacteria is...**

*Variants of answer:*

- a) hydrogen sulfide;
- b) hydrogen peroxide;
- c) hydrogen;
- d) butyric acid;
- e) propionic acid.

**125. Enzyme property is...**

*Variants of answer:*

- a) polysaccharide;
- b) low molecular weight;
- c) thermostability;
- d) high binding to transition state of substrate;
- e) high binding to product.

**126. Enzymes of protein synthesis are ...**

*Variants of answer:*

- a) exo-enzymes;

- b) connected with ribosomes;
- c) localized in cell membrane;
- d) localized in mesosomes;
- e) attached to nucleoid.

**127. Oxyreductases...**

*Variants of answer:*

- a) accelerate processes of synthesis;
- b) break bonds between carbon atoms in molecule;
- c) move residues from one molecule to another;
- d) attach water molecule to substrate;
- e) accelerate reactions of electron loss or acquisition.

**128. Lyases...**

*Variants of answer:*

- a) break bonds in molecules with hydrolytic mechanism;
- b) break bonds in molecules with non-hydrolytic mechanism;
- c) transfer atoms between groups in molecule;
- d) accelerate redox processes;
- e) make molecular interconnection.

**129. Hydrolases...**

*Variants of answer:*

- a) accelerate synthesis of complex substances from simple ones;
- b) break bonds in molecules with non-hydrolytic mechanism;
- c) break bonds in molecules with water molecule loss;
- d) break bonds in molecules with water molecule attachment;
- e) accelerate oxidative-redox processes.

**130. Enzyme of aggression is...**

*Variants of answer:*

- a) protein kinase;
- b) RNA polymerase;
- c) hyaluronidase;
- d) reverse transcriptase;
- e) DNA ligase.

**131. Medium for testing of bacterial carbohydrate fermentation is...**

*Variants of answer:*

- a) MPA;
- b) MPB;
- c) Hiss medium;
- d) gelatine;
- e) blood agar.

**132. Test substance for H<sub>2</sub>S determination after proteolysis is...**

*Variants of answer:*

- a) lead acetate (black colour);
- b) oxalate (red colour);
- c) bromocresol blue (purple colour);
- d) litmus (blue colour);
- e) silver nitrate (white colour).

**133. Pathogen of intestinal microflora is...**

*Variants of answer:*

- a) bifidobacteria;
- b) veillonella;
- c) *Helicobacter pylori*;
- d) *Escherichia coli*;
- e) *Bacteroides fragilis*.

**134. Drugs for the treatment of dysbacteriosis are...**

*Variants of answer:*

- a) antibiotics;
- b) sulfonamides;
- c) antiseptics;
- d) probiotics;
- e) absorbents.

**135. Normal microflora dominating in the vagina of adult women is...**

*Variants of answer:*

- a) lactobacilli;
- b) streptococci;
- c) bacteroids;
- d) gardnerellas;
- e) staphylococci.

**136. Enzyme property is...**

*Variants of answer:*

- a) inorganic catalyst;
- b) stabilizing of substrate transition state;
- c) low molecular weight;
- d) thermostability;
- e) increasing energy of substrate activation.

**137. The enzymes of energy metabolism are...**

*Variants of answer:*

- a) exo-enzymes;
- b) localized in ribosomes;

- c) localized in cell membrane;
- d) responsible for protein synthesis;
- e) accelerate microbial spread in affected host.

**138. Transferases...**

*Variants of answer:*

- a) accelerate synthesis of complex substances;
- b) disrupt bonds between nitrogen and carbon atoms by non-hydrolytic manner;
- c) provide movement of chemical groups from one molecule to another;
- d) accelerate redox reactions;
- e) catalyze transfer of chemical groups within the same molecule.

**139. Lygases...**

*Variants of answer:*

- a) catalyze synthesis of complex molecules from more simpler ones;
- b) transform molecules into their isomers;
- c) transpose atoms between molecules;
- d) accelerate electron and proton transfer;
- e) catalyze the decay of complex molecules.

**140. Isomerases...**

*Variants of answer:*

- a) stimulate joining of various molecules;
- b) accelerate the transfer of chemical groups or atoms within a single molecule;
- c) transfer chemical groups between various molecules;
- d) convert polymers into monomers;
- e) provide substrate oxygenation.

**141. Enzyme of aggression and invasion is...**

*Variants of answer:*

- a) collagenase;
- b) nitrate reductase;
- c) DNA polymerase;
- d) cytochrome;
- e) elongase.

**142. Medium for proteolytic enzymes detection is...**

*Variants of answer:*

- a) MPA;
- b) gelatine;
- c) McConkey medium;
- d) Hiss medium;
- e) blood agar.

**143. Indicator for indole determination after proteolysis is...**

*Variants of answer:*

- a) lead acetate (black colour);
- b) fuchsin (red colour);
- c) oxalate (pink colour);
- d) bismuth sulfite (black colour);
- e) litmus (blue colour).

**144. Sterile part of the body is...**

*Variants of answer:*

- a) skin;
- b) alveoli;
- c) stomach;
- d) intestine;
- e) vagina.

**145. Drug for the treatment of dysbacteriosis is...**

*Variants of answer:*

- a) chloramphenicol;
- b) co-trimoxazole;
- c) charcoal;
- d) colibacterin;
- e) alcohol.

**146. The microflora of the oral cavity is...**

*Variants of answer:*

- a) neisseria;
- b) bacteroids;
- c) lactobacilli;
- d) streptococci;
- e) spirochetes.

**147. Commensalism means (that) ...**

*Variants of answer:*

- a) bacteria don't affect each other;
- b) one of symbionts exploits another one without harmful effect;
- c) beneficial coexistence;
- d) two species stimulate one another with additional activating effect;
- e) microbial species exploits another one with harmful effect.

**148. Neutralism means (that) ...**

*Variants of answer:*

- a) bacteria don't affect each other;

- b) one of symbionts exploits another one without harmful effect;
- c) beneficial coexistence;
- d) two species stimulate one another with additional activating effect;
- e) microbial species exploits another one with harmful effect.

**149. Sanitary-indicative microorganisms are...**

*Variants of answer:*

- a) pathogenic bacteria;
- b) saprophytic bacteria;
- c) representatives of normal microflora;
- d) hospital ecovariants of bacteria;
- e) free-living environmental bacteria.

**150. Total microbial count for air is...**

*Variants of answer:*

- a) total microbial quantity freely sedimented from air upon 1 m<sup>2</sup> of ground area;
- b) total microbial quantity in 1 m<sup>3</sup> of air;
- c) total microbial quantity in 1 L of air;
- d) total microbial quantity in 1 cm<sup>3</sup> of air;
- e) total microbial quantity in certain room.

**151. Sanitary-indicative microorganisms for air quality testing are...**

*Variants of answer:*

- a) aerococci;
- b) *Escherichia coli*;
- c) spores of clostridia presenting in air;
- d) *Staphylococcus aureus*;
- e) *Mycobacterium tuberculosis*.

**152. Total microbial count for water is...**

*Variants of answer:*

- a) quantity of mesophilic chemoorganotrophic bacteria in 1 mL of water;
- b) quantity of mesophilic chemoorganotrophic bacteria in 100 mL of water;
- c) quantity of mesophilic chemoorganotrophic bacteria in 1 L of water;
- d) quantity of thermophilic bacteria in 1 mL of water;
- e) total quantity of thermotolerant bacteria in 1 L of water.

**153. Method for checking air quality is...**

*Variants of answer:*

- a) titration method;
- b) membrane filtration method;
- c) serial dilution method;
- d) inoculation into Kessler medium;
- e) aspiration method.

**154. Sanitary-indicative microorganisms for hand wash testing are...**

*Variants of answer:*

- a) coliform bacteria;
- b) spores of clostridia;
- c) intestinal microflora;
- d) oral microflora;
- e) *Escherichia coli*.

**155. Thermotolerant coliform bacteria are cultured at...**

*Variants of answer:*

- a) 44 °C;
- b) 50 °C;
- c) 37 °C;
- d) 20 °C;
- e) 55 °C.

**156. Overt antagonism means that...**

*Variants of answer:*

- a) bacteria produce antibiotic substances in spite of rival presence in the medium;
- b) bacteria synthesize antibiotics only when another microorganism appears in closest proximity;
- c) microorganisms produce antibiotics being cultured in starvation;
- d) microorganisms produce antibiotics when grown on selective media;
- e) bacteria secrete antibiotics inconstantly.

**157. All the listed elements comprise the common ecosystem except...**

*Variants of answer:*

- a) microbial communities;
- b) biotope;
- c) relationships established among symbiotic microbial populations;
- d) competition for nutrients amongst various bacterial species inhabiting the same locality;
- e) microbial communities inhabiting non-related biotopes.

**158. Mutualism means (that) ...**

*Variants of answer:*

- a) bacteria don't influence one another;
- b) one of symbionts exploits another one without harmful effect;
- c) beneficial coexistence;
- d) two species stimulate one another with additional activating effect;
- e) microbial species exploits another one with harmful effect.

**159. Synergism means(that) ...**

*Variants of answer:*

- a) bacteria don't influence one another;
- b) one of symbionts exploits another one without harmful effect;
- c) beneficial coexistence;
- d) two species stimulate one another with additional activating effect;
- e) microbial species exploits another one with harmful effect.

**160. The typical property of sanitary-indicative microorganisms is...**

*Variants of answer:*

- a) representation of temporary (or casual) microflora of human body;
- b) living longer than pathogenic bacteria;
- c) having special reservoir for propagation outside the body;
- d) being easily monitored by standard microbiological tests;
- e) being capable of reproduction in the environment.

**161. Sanitary-indicative microorganisms for water are...**

*Variants of answer:*

- a) pseudomonads;
- b) slime moulds;
- c) salmonellae;
- d) clostridia;
- e) coliform bacteria.

**162. Model sanitary microorganisms for air are...**

*Variants of answer:*

- a) pathogenic meningococci;
- b) non-pathogenic tetracocci;
- c) non-pathogenic micrococci;
- d) non-hemolytic staphylococci;
- e) hemolytic streptococci.

**163. This essential feature for hospital (or nosocomial) strains is...**

*Variants of answer:*

- a) multiple resistance to antibiotics;
- b) survival as planktonic forms;
- c) slow production of virulence factors;
- d) spore-forming bacteria;
- e) circulation in the environment.

**164. Water microbial testing method is...**

*Variants of answer:*

- a) blood agar plating;

- b) membrane filtration;
- c) aspiration test;
- d) sedimentation test;
- e) deep agar cultivation.

**165. Property of *Escherichia coli* is...**

*Variants of answer:*

- a) Gram-positive rods;
- b) Gram-negative rods;
- c) oxydase-positive;
- d) spore-forming bacteria;
- e) lactose-negative bacteria.

**166. Final products of lactose fermentation by coliform bacteria are...**

*Variants of answer:*

- a) gases and acids;
- b) gases only;
- c) acids only;
- d) neither acids no gases;
- e) alcohols and gases.

**167. Forced antagonism means that...**

*Variants of answer:*

- a) bacteria produce antibiotics in spite of rival presence in the medium;
- b) bacteria synthesize antibiotics only in presence of another microorganism;
- c) microorganisms produce antibiotics being cultured in starvation;
- d) microorganisms produce antibiotics when grown on selective media;
- e) bacteria occasionally secrete antibiotics.

**168. Bacteria transmitted predominantly by air-droplet route are...**

*Variants of answer:*

- a) leptospirae;
- b) salmonellae;
- c) treponemas;
- d) mycobacteria;
- e) shigellae.

**169. Antibiotics affecting the cytoplasmic membrane are...**

*Variants of answer:*

- a) beta-lactams;
- b) aminoglycosides;
- c) macrolides;
- d) polyenes;
- e) tetracyclines.

**170. Antibiotic(s) blocking bacterial protein synthesis are...**

*Variants of answer:*

- a) beta-lactams;
- b) rifampicin;
- c) fluoroquinolones;
- d) sulfonamides;
- e) aminoglycosides.

**171. Antibiotics inhibiting nucleic acid replication are...**

*Variants of answer:*

- a) fluoroquinolones;
- b) penicillins;
- c) glycopeptides;
- d) aminoglycosides;
- e) cephalosporins.

**172. Genetic resistance to antibiotics occurs after...**

*Variants of answer:*

- a) plasmid acquisition resulting in conjugation;
- b) inhibition of antibiotic influx;
- c) acceleration of synthesis of molecular targets for antibiotic drugs;
- d) activation of antibiotic efflux;
- e) beta-lactamase synthesis.

**173. Bactericidal drug is...**

*Variants of answer:*

- a) doxycycline;
- b) erythromycin in low doses;
- c) sulfamethoxazole;
- d) chloramphenicol;
- e) none of the mentioned variants.

**174. Antibiotics derived from bacteria are...**

*Variants of answer:*

- a) penicillins;
- b) cephalosporins;
- c) polymyxins;
- d) fluoroquinolones;
- e) tetracyclines.

**175. Method for minimum inhibitory concentration (MIC) determination is...**

*Variants of answer:*

- a) disk diffusion method;

- b) immune diffusion method;
- c) serial dilution method;
- d) neutralization method;
- e) biological method.

**176. All the listed antibiotics develop bactericidal effect except...**

*Variants of answer:*

- a) penicillins;
- b) cephalosporins;
- c) fluoroquinolones;
- d) rifampin;
- e) tetracyclines.

**177. Frequent allergic side effects are characteristics of...**

*Variants of answer:*

- a) rifampin;
- b) sulfonamides;
- c) beta-lactams;
- d) azalides;
- e) aminoglycosides.

**178. Enzyme inactivating cephalosporins is...**

*Variants of answer:*

- a) transacetylase;
- b) beta-lactamase;
- c) dihydrofolate reductase;
- d) peptidyl transferase;
- e) none of the mentioned variants.

**179. Levels of minimal bactericidal concentration in comparison with minimal inhibitory concentration are...**

*Variants of answer:*

- a) less;
- b) equal or less;
- c) equal;
- d) equal or more;
- e) more.

**180. Antibiotics inhibiting cell wall synthesis are...**

*Variants of answer:*

- a) polyens;
- b) beta-lactams;
- c) macrolides;

- d) tetracyclines;
- e) aminoglycosides.

**181. Antibiotic(s) blocking protein synthesis is (are) ...**

*Variants of answer:*

- a) cephalosporins;
- b) rifampicin;
- c) azalides;
- d) fluoroquinolones;
- e) sulfonamides.

**182. Antibiotic(s) inhibiting nucleic acid metabolism is (are) ...**

*Variants of answer:*

- a) rifampicin;
- b) penicillins;
- c) azalides;
- d) aminoglycosides;
- e) lincomycin.

**183. Antibiotic(s) derived from actinomycetes is (are) ...**

*Variants of answer:*

- a) penicillins;
- b) cephalosporins;
- c) fluoroquinolones;
- d) chloramphenicol;
- e) sulfonamides.

**184. Antibiotic(s) produced by plants is (are) ...**

*Variants of answer:*

- a) penicillins;
- b) phytoncides;
- c) azalides;
- d) vancomycin;
- e) amphotericin A and B.

**185. First stage of beta-lactam antibiotics action is...**

*Variants of answer:*

- a) hydrolysis of cell wall;
- b) phagocytosis activation;
- c) cell autolysis;
- d) transpeptidase inhibition;
- e) activation of trans-membrane channels.

**186. Side effect(s) of antibiotic therapy is (are) ...**

*Variants of answer:*

- a) allergic reactions;
- b) direct toxic effects;
- c) antibiotic resistance development;
- d) endotoxic shock emergence;
- e) all the mentioned variants.

**187. The hypoallergenic drug(s) is (are) ...**

*Variants of answer:*

- a) penicillins;
- b) macrolides;
- c) chloramphenicol;
- d) cephalosporins;
- e) tetracyclines.

**188. Antifungal antibiotic(s) is (are) ...**

*Variants of answer:*

- a) beta-lactams;
- b) rifampin;
- c) polyenes;
- d) macrolides;
- e) aztreonam.

**189. Antibiotics occasionally causing serum sickness are...**

*Variants of answer:*

- a) erythromycins;
- b) aminoglycosides;
- c) penicillins;
- d) azalides;
- e) sulfonamides.

**190. Diffusion antibiotic susceptibility test with MIC determination is...**

*Variants of answer:*

- a) disc diffusion test;
- b) E-test;
- c) immune diffusion test;
- d) agar serial dilution test;
- e) broth serial dilution test.

**191. The base essential only for RNA is...**

*Variants of answer:*

- a) adenine;

- b) thymine;
- c) guanine;
- d) cytosine;
- e) uracil.

**192. Messenger RNA synthesis results from...**

*Variants of answer:*

- a) transcription;
- b) translation;
- c) transduction;
- d) transformation;
- e) translocation.

**193. Genetic sequence in operon that interacts with RNA polymerase for transcription initiation is called...**

*Variants of answer:*

- a) regulatory gene;
- b) operator;
- c) promoter;
- d) enhancer;
- e) structural gene.

**194. What statement isn't true?**

*Variants of answer:*

- a) essential for bacterial metabolism genes are localized mainly in nucleoid;
- b) autonomous bacterial replicons able to integrate to nucleoid are named episomes;
- c) bacterial genome is diploid;
- d) bacterial genetic information is stored in DNA;
- e) bacterial DNA replication starts from *ori*-locus.

**195. Genetic sequence ensuring bacterial capacity to conjugation is called...**

*Variants of answer:*

- a) *ori*-locus;
- b) prophage sequence;
- c) *lac*-operon;
- d) transfer operon (*tra*-operon);
- e) competence factor.

**196. The plasmid encoding hemolysin synthesis is...**

*Variants of answer:*

- a) R-plasmid;

- b) Ent-plasmid;
- c) Hly-plasmid;
- d) Col-plasmid;
- e) fertility (F) factor.

**197. Variant of recombination is...**

*Variants of answer:*

- a) transformation;
- b) dissociation;
- c) reparation;
- d) modification;
- e) duplication.

**198. High-frequency recombination cell appears due to...**

*Variants of answer:*

- a) missense mutation;
- b) lysogenic conversion;
- c) tra-operon activation;
- d) transposon integration;
- e) F-factor integration into nucleoid.

**199. Possible transduction type where accepted genetic material isn't included into nucleoid is called...**

*Variants of answer:*

- a) general transduction;
- b) specific transduction;
- c) illegitimate transduction;
- d) abortive transduction;
- e) none of the mentioned variants.

**200. The stage needed only for RNA viruses detection by PCR is...**

*Variants of answer:*

- a) DNA melting;
- b) primer annealing;
- c) DNA polymerization;
- d) amplification cycle repeat;
- e) reverse transcription.

**201. Northern blotting is used for...**

*Variants of answer:*

- a) DNA identification;
- b) RNA identification;
- c) protein identification;

- d) DNA sequencing;
- e) peptide synthesis.

**202. Complementary base in RNA for uracil is...**

*Variants of answer:*

- a) adenine;
- b) thymine;
- c) guanine;
- d) methyl-guanine;
- e) cytosine.

**203. The largest replicon in bacterial cell is...**

*Variants of answer:*

- a) plasmid;
- b) episome;
- c) transposon;
- d) insertion sequence;
- e) nucleoid.

**204. Genetic sequence in operon that accelerates transcription via the interaction with specific activator proteins is called...**

*Variants of answer:*

- a) regulatory gene;
- b) operator;
- c) structural gene;
- d) promoter ;
- e) enhancer.

**205. The structure not relating to plasmids is...**

*Variants of answer:*

- a) F-factor;
- b) resistance factor;
- c) factor of bacteriocinogenesis;
- d) competence factor;
- e) Col-factor.

**206. Mobile genetic element is...**

*Variants of answer:*

- a) regulon;
- b) replicon;
- c) operon;
- d) bacteriocin;
- e) insertion sequence (IS element).

**207. Genetic process causing frame shift mutation is...**

*Variants of answer:*

- a) nucleotide deletion;
- b) nucleotide replacement;
- c) triplet insertion;
- d) codon deletion;
- e) codon translocation.

**208. Non-genetic variation is...**

*Variants of answer:*

- a) transformation;
- b) transduction;
- c) conjugation;
- d) reparation;
- e) modification.

**209. Bacterial transformation is performed after...**

*Variants of answer:*

- a) mutagen action;
- b) bacteriophage entry;
- c) plasmid acceptance;
- d) donor's DNA uptake;
- e) none of the mentioned variants.

**210. Responsible for recombination process enzymes are called...**

*Variants of answer:*

- a) Rec-proteins;
- b) G-proteins;
- c) transposases;
- d) proteinkinases;
- e) transferases.

**211. Hybridization technique is based on...**

*Variants of answer:*

- a) gene transfer by vectors;
- b) genetic recombination;
- c) DNA or RNA interaction with complementary probe;
- d) DNA amplification;
- e) genetic transposition.

**212. The fastest method of genetic sequencing is...**

*Variants of answer:*

- a) Sanger method;

- b) Maxam – Gilbert sequencing;
- c) shotgun technique;
- d) chromosome walking;
- e) pyrosequencing.

**213. Part of bacteriophage containing phage nucleic acid is...**

*Variants of answer:*

- a) tail;
- b) head;
- c) sheath;
- d) fibers;
- e) basal plate.

**214. Phage structure that provides for specific phage binding to bacterial cell is called...**

*Variants of answer:*

- a) fibers;
- b) tail;
- c) head;
- d) head capsomers;
- e) phage nucleic acid.

**215. The enzyme facilitating phage entry into bacterial cell is...**

*Variants of answer:*

- a) hyaluronidase;
- b) protease;
- c) lysozyme;
- d) nuclease;
- e) phospholipase.

**216. All the listed stages present in course of productive phage infection except...**

*Variants of answer:*

- a) adsorption;
- b) cell penetration;
- c) lysogeny;
- d) reproduction;
- e) phage release.

**217. Disjunctive type of phage reproduction means...**

*Variants of answer:*

- a) that phage components are synthesized in separate bacterial cell compartments followed by next virion assembly;
- b) that phage replication occurs in special separated cell compartment;

- c) sequential (step-by-step) synthesis of phage components;
- d) repeated temporary termination of synthesis of phage proteins and nucleic acid;
- e) that replication of phage nucleic acid precedes the synthesis of viral proteins.

**218. Phage (or lysogenic) conversion means...**

*Variants of answer:*

- a) transformation of DNA-containing phages into RNA-containing ones;
- b) activation of latent phages;
- c) disassembling of phage particle;
- d) that bacterial cell acquires new features as the result of prophage gene expression;
- e) lysis of bacterial cell by offspring phage particles.

**219. Prophage is...**

*Variants of answer:*

- a) parental bacteriophage initially presented in bacterial cell;
- b) nucleic acid of temperate phage integrated into bacterial genome;
- c) immature phage;
- d) degrading phage particle;
- e) dormant phage particle presented in bacterial cytoplasm.

**220. Integration of phage DNA into bacterial chromosome occurs due to...**

*Variants of answer:*

- a) spontaneous mutations;
- b) induced mutagenesis;
- c) site-specific recombination of bacterial and viral DNA;
- d) incorrect reparation of bacterial genome;
- e) error-prone replication of bacterial DNA.

**221. Lysogenic conversion can generate...**

*Variants of answer:*

- a) exotoxin production by bacteria;
- b) change of structure of bacterial cell wall;
- c) synthesis of invasive enzymes;
- d) antibiotic resistance;
- e) all the mentioned variants.

**222. Phage titer in liquid medium test means...**

*Variants of answer:*

- a) certain tube dilution of bacteriophages;
- b) last dilution of phage culture able to cause complete inhibition of bacterial growth in standard experimental conditions;

- c) total number of phage particles;
- d) total number of phage plaques;
- e) minimal amount of specific antibodies completely inactivating standard number of phages.

**223. Phagotyping implies...**

*Variants of answer:*

- a) identification of limited bacterial population susceptible to highly specific bacteriophages;
- b) accumulation of phage particles in liquid or solid medium;
- c) classification of phages according to their properties;
- d) identification of bacteria having specific phage genome;
- e) transduction of bacterial culture.

**224. The structure containing the genes of enzymes and antibiotic resistance is called...**

*Variants of answer:*

- a) plasmid;
- b) pilus;
- c) capsule;
- d) plasma membrane;
- e) DNA.

**225. The most important structure for attaching microbes to cells is called...**

*Variants of answer:*

- a) flagellum;
- b) plasmid;
- c) peptidoglycan;
- d) glycocalyx;
- e) plasma membrane.

**226. The statement does not applying to endotoxin is that...**

*Variants of answer:*

- a) endotoxins are secreted from cells;
- b) it can be linked to meningococemia;
- c) it is produced by Gram-negative microorganisms;
- d) it can cause fever;
- e) endotoxins are also called LPS.

**227. Choose the incorrect pair of the microorganism and the nutrient medium for its cultivation.**

*Variants of answer:*

- a) fungi – Sabouraud agar;

- b) *Neisseria gonorrhoeae* – Endo agar;
- c) *Haemophilus influenzae* – chocolate agar;
- d) *Mycobacterium tuberculosis*– Lowenstein – Jensen agar;
- e) *Escherichia coli* – McConkey agar.

**228. The part of the microscope that collects and focuses light rays on the sample being studied is called...**

*Variants of answer:*

- a) condenser lens;
- b) magnifying lens;
- c) objective lens;
- d) eyepiece lens;
- e) all the mentioned variants.

**229. Which ones of the following substances are produced by microorganisms?**

*Variants of answer:*

- a) alcoholic beverages;
- b) fermented dairy products;
- c) bread;
- d) all the mentioned variants;
- e) folic acid and vitamin K.

**230. What is the approximate size of the bacterial cell?**

*Variants of answer:*

- a) 1 mm in diameter;
- b) 0.5 to 1.0  $\mu\text{m}$  in diameter;
- c) 2 mm in diameter;
- d) 2  $\mu\text{m}$  in diameter;
- e) more than 2  $\mu\text{m}$  in diameter.

**231. Which one of the following variants is spirochete?**

*Variants of answer:*

- a) *Streptomyces species*;
- b) *Treponema pallidum*;
- c) *Spirillum volutans*;
- d) *Corynebacterium diphtheriae*;
- e) *Mycobacterium tuberculosis*.

**232. Bacteria having clusters of flagella at both poles of cells are known as...**

*Variants of answer:*

- a) amphitrichous bacteria;
- b) monotrichous bacteria;

- c) peritrichous bacteria;
- d) lophotrichous bacteria;
- e) all the mentioned variants.

**233. *The respiratory chain of bacteria is associated with the ...***

*Variants of answer:*

- a) cytoplasmic membrane;
- b) cell wall;
- c) cytoplasm;
- d) mitochondrial membrane;
- e) flagellum.

**234. *Glycolysis can occur in...***

*Variants of answer:*

- a) anaerobic cells;
- b) aerobic cells;
- c) neither aerobic nor anaerobic cells;
- d) both aerobic and anaerobic cells;
- e) host cell.

**235. *Which one(s) of the following enzymes remove(s) the RNA primer with its 5'-nuclease activity?***

*Variants of answer:*

- a) DNA polymerase III;
- b) RNA polymerase;
- c) DNA polymerase I;
- d) DNA polymerase II;
- e) DNA polymerases I and II.

**236. *Which one(s) of the following method(s) can be used to determine the number of bacteria quantitatively?***

*Variants of answer:*

- a) spread plate method;
- b) streak plate method;
- c) pour plate and spread plate methods;
- d) pour plate method;
- e) microscopy.

**237. *Which method inhibits DNA replication?***

*Variants of answer:*

- a) X-rays;
- b) gamma-rays;
- c) ultraviolet light;

- d) cathode rays;
- e) all the mentioned variants.

**238. Which method is the most accurate one for microbial assay of antibiotics?**

*Variants of answer:*

- a) chemical and biological assay;
- b) biological assay;
- c) chemical assay;
- d) physical assay;
- e) physical and biological assay.

**239. Cellulose is degraded to cellobiose by the enzyme...**

*Variants of answer:*

- a) cellulose dehydrogenase;
- b) hexokinase;
- c) beta-glucosidase;
- d) cellulase;
- e) RNA polymerase.

**240. The blood serum proteins produced by animals called as...**

*Variants of answer:*

- a) enzymes;
- b) antibodies;
- c) amino acids;
- d) toxins;
- e) antigens.

**241. The principal microorganism for yogurt is...**

*Variants of answer:*

- a) *Leuconostoc citrovorum*;
- b) *Streptococcus lactis*;
- c) *Streptococcus thermophilus*;
- d) *Lactobacillus acidophilus*;
- e) *Haemophilus influenzae*.

**242. Acridine orange is a mutagen of a group...**

*Variants of answer:*

- a) chemical compounds;
- b) transposons;
- c) base analogs;
- d) intercalating agents;
- e) all the mentioned variants.

**243. Lipopolysaccharide in cell walls is a characteristic of...**

*Variants of answer:*

- a) algae;
- b) fungi;
- c) Gram-negative bacteria;
- d) Gram-positive bacteria;
- e) protozoa.

**244. Which one(s) of the following features are true for cytoplasmic membrane?**

*Variants of answer:*

- a) site of generation of protonmotive force;
- b) hydrophilic barrier;
- c) hydrophobic barrier;
- d) hydrophobic barrier and site of generation of protonmotive force;
- e) hydrophilic and hydrophobic barriers.

**245. The nucleoid can be made visible under the light microscope by...**

*Variants of answer:*

- a) methylene blue;
- b) iodine;
- c) Nile blue;
- d) Feulgen staining;
- e) uchsinn.

**246. Which one of the following methods is not a physical method for selection of pure culture?**

*Variants of answer:*

- a) heat treatment;
- b) pH of the media;
- c) cell size and motility;
- d) use of dilute media;
- e) all the mentioned variants.

**247. Isolation of pure culture refers to...**

*Variants of answer:*

- a) purification of culture;
- b) introduction of inoculum;
- c) separation of a single colony;
- d) growing microorganisms on a surface;
- e) all the mentioned variants.

**248. Which phase shows the reproduction rate equal to the equivalent death rate?**

*Variants of answer:*

- a) log phase;
- b) stationary phase;
- c) death phase;
- d) lag phase;
- e) all the mentioned variants.

**249. What is the color of colonies of *Staphylococcus aureus*?**

*Variants of answer:*

- a) pink;
- b) red;
- c) violet;
- d) gold;
- e) green.

**250. A device for cultivating microorganisms at a constant temperature is called...**

*Variants of answer:*

- a) anaerostat;
- b) thermostat;
- c) hemocultivator;
- d) autoclave;
- e) bioreactor.

## **CHAPTER 2**

### **GENERAL INFECTOLOGY. THEORETICAL AND PRACTICAL MEDICAL IMMUNOLOGY**

*Choose one correct answer*

**251. Central organ of immune system is...**

*Variants of answer:*

- a) bone marrow;
- b) tonsils;
- c) lymph node;
- d) spleen;
- e) blood.

**252. Cells of immune system bearing Ag-specific receptors are...**

*Variants of answer:*

- a) mononuclear phagocytes system;
- b) granulocytes system;
- c) NK cells;
- d) T cells and B cells;
- e) platelets system.

**253. Natural active immunity is developed...**

*Variants of answer:*

- a) in breast feeding;
- b) after vaccination;
- c) after infectious disease;
- d) from mother to fetus through the placenta;
- e) after Ig administration.

**254. Artificial passive immunity is obtained...**

*Variants of answer:*

- a) after infectious disease;
- b) after vaccination;
- c) due to Ig introduction;
- d) after toxoid injection;
- e) from mother to fetus through the placenta.

**255. Respiratory burst means...**

*Variants of answer:*

- a) biological oxidation in bacteria;
- b) mitochondrial respiration in lymphocytes;
- c) activation of reactive oxygen species in phagocytes;
- d) oxidative phosphorylation in phagocytes;
- e) oxygenation of lymphoid tissue.

**256. The organ of antigen-independent differentiation of T lymphocytes is...**

*Variants of answer:*

- a) lymph node;
- b) thymus;
- c) spleen;
- d) liver;
- e) tonsils.

**257. Pro-inflammatory cytokine is...**

*Variants of answer:*

- a) IL-10;

- b) IL-12;
- c) IL-3;
- d) IL-7;
- e) IL-4.

**258. Phagocytic cells are...**

*Variants of answer:*

- a) monocytes;
- b) T cells;
- c) B lymphocytes;
- d) plasma cells;
- e) NKs.

**259. T helper marker is...**

*Variants of answer:*

- a) CD1;
- b) CD40;
- c) CD4;
- d) CD8;
- e) CD5.

**260. CD-marker of B cells is...**

*Variants of answer:*

- a) CD19;
- b) CD8;
- c) CD4;
- d) CD2;
- e) CD3.

**261. CD-marker of cytotoxic lymphocytes is...**

*Variants of answer:*

- a) CD1;
- b) CD2;
- c) CD4;
- d) CD5;
- e) CD8.

**262. Type of immunity formed after toxoid injection is called...**

*Variants of answer:*

- a) artificial passive immunity;
- b) artificial active immunity;
- c) natural active immunity;
- d) natural passive immunity;
- e) non-sterile immunity.

**263. Antibodies enhancing phagocytosis are called...**

*Variants of answer:*

- a) agglutinins;
- b) precipitins;
- c) hemolysins;
- d) opsonins;
- e) antitoxins.

**264. Macrophages perform...**

*Variants of answer:*

- a) bacterial engulfment;
- b) cytokines secretion;
- c) antigen presentation;
- d) microbial degradation;
- e) all the mentioned variants.

**265. Newborn child obtains from mother...**

*Variants of answer:*

- a) IgM;
- b) IgA;
- c) B cells;
- d) T-helper cells;
- e) phagocytes.

**266. IL-1 causes...**

*Variants of answer:*

- a) direct viral destruction;
- b) B-cells activation;
- c) anti-inflammatory effects;
- d) antibody production;
- e) fever.

**267. Natural passive immunity is obtained after...**

*Variants of answer:*

- a) from mother to fetus through the placenta;
- b) blood transfusion;
- c) infectious disease;
- d) vaccination;
- e) Ig treatment.

**268. Antibacterial substances that cause microbial degradation within phagocytes due to free radicals formation are called...**

*Variants of answer:*

- a) cathepsins;

- b) perforins;
- c) acid hydrolases;
- d) reactive oxygen species;
- e) opsonins.

**269. Property of complete antigens...**

*Variants of answer:*

- a) don't need carrier;
- b) don't need their own presentation for T cells;
- c) presumably of lipid origin;
- d) non-charged linear molecules;
- e) low molecular weight polysaccharides.

**270. Thymus-dependent antigens can be presented for T helpers by following cells:**

*Variants of answer:*

- a) neutrophils;
- b) eosinophils;
- c) epithelial cells;
- d) NK cells;
- e) B lymphocytes.

**271. Specific bacterial antigen is...**

*Variants of answer:*

- a) group antigens;
- b) Vi antigen;
- c) Rh antigens;
- d) HLA;
- e)  $\beta_2$ -microglobulin.

**272. Cells bearing major histocompatibility complex class II antigens are...**

*Variants of answer:*

- a) NK cells;
- b) dendritic cells;
- c) enterocytes;
- d) epithelial cells;
- e) erythrocytes.

**273. Specific structure of an antigen is...**

*Variants of answer:*

- a) hinge region;
- b) Fc fragment;
- c) paratope;

- d) epitope;
- e) biotope.

**274. *Erythrocyte antigenic diagnosticum is used for...***

*Variants of answer:*

- a) tube agglutination reaction;
- b) indirect hemagglutination test (RIHA);
- c) direct hemagglutination test;
- d) hemolysis reaction;
- e) slide agglutination reaction.

**275. *Non-infectious antigen is...***

*Variants of answer:*

- a) O antigen;
- b) H antigen;
- c) Vi antigen;
- d) K antigen;
- e) MHC antigen.

**276. *Superantigens induce...***

*Variants of answer:*

- a) up to 2 % of common T-cells activation;
- b) up to 20 % of common T-cells activation;
- c) B cells activation;
- d) classic pathway complement activation;
- e) IL-4 and IL-10 secretion.

**277. *CD8<sup>+</sup> cells recognize antigen peptide in complex with...***

*Variants of answer:*

- a) B-cell receptor of a lymphocyte;
- b) IL-2 receptor;
- c) HLA class I Ag
- d) HLA class I Ag
- e) without any complexes.

**278. *Hapten is characterized by...***

*Variants of answer:*

- a) strong immunogenicity;
- b) complete antigen;
- c) high molecular weight;
- d) the need for an adjuvant;
- e) the need for a carrier.

**279. Which one(s) of listed substances are considered to complete antigens?**

*Variants of answer:*

- a) lipids;
- b) proteins;
- c) glucose;
- d) vitamins;
- e) beta-lactam antibiotics.

**280. The structure complementary to antigenic determinant is...**

*Variants of answer:*

- a) biotope;
- b) paratope;
- c) episome;
- d) epitope;
- e) hinge region.

**281. Thymus-independent antigens directly induce immune response of...**

*Variants of answer:*

- a) neutrophils;
- b) NK cells;
- c) T cells;
- d) B lymphocytes;
- e) mast cells.

**282. Antigen(s) that are considered to MHC is (are) ...**

*Variants of answer:*

- a) ABO antigen;
- b) Rh antigen;
- c) superantigens;
- d) O antigen;
- e) HLA.

**283. All the listed cells bear MHC class I antigens except...**

*Variants of answer:*

- a) erythrocytes;
- b) T cells;
- c) dendritic cells;
- d) enterocytes;
- e) keratinocytes.

**284. Immunogenicity means...**

*Variants of answer:*

- a) the ability to specific binding of antigen to antibodies;

- b) the ability to induce specific response of T cells and B cells;
- c) the ability to trigger phagocytosis;
- d) the ability to activate complement system;
- e) the ability to induce tolerance.

**285. Coombs' test estimates ...**

*Variants of answer:*

- a) incomplete antibodies;
- b) incomplete antigens;
- c) incomplete phagocytosis;
- d) T cell receptors;
- e) Rh antigens.

**286. Erythrocyte antigenic diagnosticum means ...**

*Variants of answer:*

- a) antigens of erythrocytes;
- b) erythrocytes attached to polymeric microbeads;
- c) erythrocytes of blood group A;
- d) erythrocytes linked with antigens;
- e) erythrocytes with attached antibodies.

**287. Antibodies against human Igs are used in ...**

*Variants of answer:*

- a) slide agglutination test;
- b) extended test tube agglutination;
- c) blood group determination;
- d) Widal's reaction;
- e) Coombs' test.

**288. Antigen-binding site of antibody is ...**

*Variants of answer:*

- a) L chain;
- b) paratope;
- c) epitope;
- d) hinge region;
- e) Fc fragment.

**289. Part of antibody responsible for Ab-cell interaction is called ...**

*Variants of answer:*

- a) light chain;
- b) heavy chain;
- c) J chain;
- d) antigen-binding fragment (Fab);
- e) Fc fragment.

**290. Binding strength of whole antibody molecule is called...**

*Variants of answer:*

- a) capacity;
- b) affinity;
- c) avidity;
- d) specificity;
- e) activity.

**291. Serum IgG concentration is...**

*Variants of answer:*

- a) 8–12 g/L;
- b) 0,8–1,5 g/L;
- c) 0–100 IU;
- d) 0,01–0,04 g/L;
- e) 1–2 g/L.

**292. IgM is characterized as...**

*Variants of answer:*

- a) monomer;
- b) dimer;
- c) trimer;
- d) pentamer;
- e) secretory molecule.

**293. Antibodies that cause allergies belong to...**

*Variants of answer:*

- a) IgM;
- b) IgG;
- c) IgA;
- d) IgD;
- e) IgE.

**294. Toxigenicity of diphtheria bacilli culture is determined by...**

*Variants of answer:*

- a) agglutination reaction;
- b) indirect hemagglutination assay;
- c) neutralization reaction;
- d) radial immune diffusion;
- e) immune electrophoresis.

**295. Ig capable to pass through the placental barrier is...**

*Variants of answer:*

- a) IgG;

- b) IgA;
- c) IgM;
- d) IgE;
- e) IgD.

**296. Reagent for neutralization reaction is...**

*Variants of answer:*

- a) diagnosticum;
- b) antitoxic serum;
- c) antimicrobial serum;
- d) erythrocyte diagnosticum;
- e) agglutinating serum.

**297. Method for IgE concentration assessment is called...**

*Variants of answer:*

- a) agglutination test;
- b) Ascoli test;
- c) Coomb' test;
- d) ELISA;
- e) CFT.

**298. Antigen-binding site of antibody is formed by...**

*Variants of answer:*

- a) domains of L chain;
- b) domains of H chain;
- c) constant domains;
- d) variable domains;
- e) hinge region.

**299. Part of antibody responsible for complement activation is called...**

*Variants of answer:*

- a) L chain;
- b) H chain;
- c) Fc fragment;
- d) Fab fragment;
- e) paratope.

**300. Binding capacity of antibody active site is called...**

*Variants of answer:*

- a) affinity;
- b) avidity;
- c) reactivity;
- d) specificity;
- e) immunogenicity.

**301. Serum IgM concentration is...**

*Variants of answer:*

- a) 8–12 g/L;
- b) 0–100 IU;
- c) 0,01–0,04 g/L;
- e) 2–4 g/L;
- d) 0,8–1,5 g/L.

**302. The main advantage of immune electrophoresis is...**

*Variants of answer:*

- a) able to determine the pathogenicity factors of the pathogen;
- b) able to determine the genome of the pathogen of the disease;
- c) one-step solid phase test;
- d) able to identify particular antigens in complex antigenic mixture;
- e) easy performance and low cost.

**303. Ig molecule with secretory component is...**

*Variants of answer:*

- a) IgM;
- b) IgG;
- c) IgD;
- d) IgA;
- e) IgE.

**304. Reagent for precipitation reaction is called...**

*Variants of answer:*

- a) microbial diagnosticum;
- b) soluble antigen;
- c) erythrocyte diagnosticum;
- d) serum containing an active complement;
- e) viral diagnosticum.

**305. Component of complement system starting alternative pathway activation is...**

*Variants of answer:*

- a) C1;
- b) C2;
- c) C3;
- d) C4;
- e) C5.

**306. Classical pathway convertase is...**

*Variants of answer:*

- a) C3b;

- b) C3bBb;
- c) C1qrs;
- d) C4bC2a;
- e) C5b-C9.

**307. Hemolysis reaction is used for...**

*Variants of answer:*

- a) bacteriolysis test;
- b) complement activity determination;
- c) ELISA;
- d) Coombs' reaction;
- e) western blotting.

**308. Reagent for indirect immune fluorescence test is...**

*Variants of answer:*

- a) anti-globulin labelled with enzyme;
- b) anti-globulin labelled with isotope;
- c) anti-globulin labelled with  $^{125}\text{I}$ ;
- d) anti-globulin labelled with horseradish peroxidase;
- e) anti-globulin labelled with fluorescein isothiocyanate.

**309. Potent anaphylatoxin is...**

*Variants of answer:*

- a) C5a;
- b) membrane attack complex (MAC);
- c) C2a;
- d) C4b;
- e) C1qrs.

**310. Antiglobulin serum is obtained by...**

*Variants of answer:*

- a) hyperimmunization of rabbits with erythrocytes;
- b) hyperimmunization of rabbits with human antibodies;
- c) hyperimmunization of rabbits with globular synthetic microbeads;
- d) hyperimmunization of mice with hapten;
- e) hyperimmunization of goats with mouse albumin.

**311. First step for immunoblotting is...**

*Variants of answer:*

- a) immune electrophoresis;
- b) radial immune diffusion;
- c) indirect enzyme-linked immune assay;
- d) polyacrylamide electrophoresis;
- e) Ascoli test.

**312. Lectin pathway is activated by...**

*Variants of answer:*

- a) immune complex;
- b) bacterial flagellin;
- c) mannose-binding protein;
- d) C3b component;
- e) Fc fragment.

**313. Classic pathway of complement activation is initiated by...**

*Variants of answer:*

- a) antibodies;
- b) antigens;
- c) immune complex formation;
- d) toxins;
- e) LPS.

**314. Immunological test allowing determination of any cell sub-population by identification of its membrane CD molecules is called...**

*Variants of answer:*

- a) RIA;
- b) ELISA;
- c) indirect immune fluorescence test with monoclonal antibodies;
- d) indirect hemagglutination test;
- e) CFT.

**315. In classic pathway C1q subunit is attached to...**

*Variants of answer:*

- a) CH3 Ig domain;
- b) CH2 Ig domain;
- c) CH1 Ig domain;
- d) variable domain of the antibody light chain domain;
- e) constant domain of the light chain (CL) domain.

**316. Complement can take part in...**

*Variants of answer:*

- a) cell lysis;
- b) opsonization;
- c) chemotaxis;
- d) allergy development;
- e) all the mentioned variants.

**317. C5 convertase in alternative pathway is...**

*Variants of answer:*

- a) C3b;

- b) C3bBb;
- c) C4bC2a;
- d) C3bBbC3b(P);
- e) MAC.

**318. Cell lysis due to complement action is performed by...**

*Variants of answer:*

- a) membrane attack complex;
- b) anaphylatoxin attack;
- c) immune complex;
- d) C3 convertase;
- e) C5 convertase.

**319. Method for simultaneous determination of different antigenic or antibody fractions is called...**

*Variants of answer:*

- a) immunofluorescent test;
- b) immunoblotting test;
- c) RIA;
- d) enzyme immunoassay;
- e) radioallergosorbent test.

**320. Hemolytic serum is obtained by...**

*Variants of answer:*

- a) hyperimmunization of rabbits with microbial cells;
- b) hyperimmunization of mice with bacteria;
- c) hyperimmunization of rabbits with human erythrocytes;
- d) hyperimmunization of mice with complement;
- e) hyperimmunization of rabbits with sheep erythrocytes.

**321. Protein blotting is named as...**

*Variants of answer:*

- a) eastern blotting;
- b) southern blotting;
- c) northern blotting;
- d) western blotting;
- e) none of the mentioned variants.

**322. T-independent immune response results in production of...**

*Variants of answer:*

- a) IgM antibodies;
- b) IgG antibodies;
- c) IgA antibodies;

- d) IgG and IgA antibodies;
- e) all the mentioned variants.

**323. Predominant cytokine promoting Ig class switches from IgM to other classes is...**

*Variants of answer:*

- a) IL-1;
- b) IL-2;
- c) IL-3;
- d) IL-4;
- e)  $\gamma$ -IFN.

**324. Professional antigen presenting cells are...**

*Variants of answer:*

- a) granulocytes;
- b) dendritic cells;
- c) platelets;
- d) NK cells;
- e) plasma cells.

**325. The cells able to present endogenous antigens to T-cytotoxic cells are...**

*Variants of answer:*

- a) epithelial cells;
- b) fibroblasts;
- c) macrophages;
- d) hepatocytes;
- e) all the mentioned variants.

**326. Essential cytokines of Th-2 are...**

*Variants of answer:*

- a) IL-4, IL-5, IL-10, IL-13;
- b) IL-2,  $\gamma$ -IFN,  $\beta$ -TNF;
- c) IL-1, IL-6, IL-12, IL-18,  $\alpha$ -TNF;
- d) IL-10, transforming growth factor beta (TGF- $\beta$ );
- e) colony stimulating factor (CSF).

**327. Family of pattern-recognizing receptors is...**

*Variants of answer:*

- a) Fc receptors;
- b) integrins;
- c) selectins;
- d) toll-like receptors;
- e) cytokine receptors.

**328. Toll-like receptors (TLR) 4 specifically binds to...**

*Variants of answer:*

- a) viral dsRNA;
- b) bacterial DNA;
- c) bacterial lipoproteins;
- d) flagellin;
- e) bacterial LPS.

**329. TLR2 specifically binds to...**

*Variants of answer:*

- a) viral dsRNA;
- b) bacterial DNA;
- c) lipoproteins, lipoteichoic acids, peptidoglycan;
- d) flagellin;
- e) bacterial LPS.

**330. Main cellular reaction of innate immunity against bacterial infections is...**

*Variants of answer:*

- a) complement activation;
- b) synthesis of antibodies by plasma cells;
- c) activation of cytotoxic T cells;
- d) phagocytosis;
- e) acute-phase protein synthesis.

**331. Primary immune response is characterized by...**

*Variants of answer:*

- a) IgG synthesis;
- b) IgA synthesis;
- c) IgE synthesis;
- d) IgD synthesis;
- e) IgM synthesis.

**332. T cells have receptors that are...**

*Variants of answer:*

- a) IgG;
- b) T-cell receptor, CD45RO;
- c) CD19, CD20;
- d) CD35;
- e) CD16, CD56.

**333. Membrane-affecting molecule of T-cytotoxic cells is...**

*Variants of answer:*

- a) granzyme;

- b) perforin;
- c) MAC;
- d) tryptase;
- e) bradykinin.

**334. Acute-phase proteins of immune response include...**

*Variants of answer:*

- a) C-reactive protein;
- b) fibronectin;
- c) mannan-binding lectin;
- d)  $\alpha$ 2-macroglobulin;
- e) all the mentioned variants.

**335. Anti-idiotypic antibodies suppress...**

*Variants of answer:*

- a) primary antibodies triggered by antigenic epitopes;
- b) phagocyte activity;
- c) complement activation;
- d) synthesis of heterologous antibodies;
- e) cytokine secretion.

**336. Essential cytokines of Th-1 are...**

*Variants of answer:*

- a) IL-2,  $\gamma$ -IFN;
- b) IL-4, IL-10, IL-13, IL-15;
- c) IL-1, IL-6, IL-12, IL-18,  $\alpha$ -TNF;
- d) IL-10, TGF- $\beta$ ;
- e) IL-3, IL-7.

**337. Humoral immune response is activated by...**

*Variants of answer:*

- a) Th-1;
- b) Th-2;
- c) Th-3;
- d) T-cytotoxic cells;
- e) NK cells.

**338. 2<sup>nd</sup> type hypersensitivity (cytotoxic hypersensitivity) is characterized by participation of...**

*Variants of answer:*

- a) basophils;
- b) complement system;

- c) mast cells;
- d) IgE;
- e) IgD.

**339. All the listed substances can be allergenic ones except...**

*Variants of answer:*

- a) glucose;
- b) drugs;
- c) wool;
- d) industrial chemicals;
- e) foodstuffs.

**340. Normal value of CD4/CD8 ratio (immunoregulatory index) is...**

*Variants of answer:*

- a) less than 1;
- b) 1,0–1,5;
- c) 1,5–2,0;
- d) 2,0–3,0;
- e) more than 3,0.

**341. Secondary immunodeficiencies are stimulated by...**

*Variants of answer:*

- a) viral infections;
- b) chemical environmental pollution;
- c) radiation;
- d) immunosuppressive drugs treatment;
- e) all the mentioned variants.

**342. Immediate hypersensitivity manifests after antigenic stimulation in...**

*Variants of answer:*

- a) 30 min – 16 hrs;
- b) 24–36 hrs;
- c) 36–48 hrs;
- d) 48–72 hrs;
- e) about 5 days.

**343. Recombinant vaccine is...**

*Variants of answer:*

- a) influenza vaccine;
- b) yellow fever vaccine;
- c) hepatitis B vaccine;
- d) smallpox vaccine;
- e) anthrax vaccine.

**344. Functional test for activity of T or B cells is called...**

*Variants of answer:*

- a) CFT;
- b) test of lymphocyte blast transformation;
- c) agglutination test;
- d) nitroblue tetrazolium reduction (NBT) test;
- e) immune fluorescence with anti-CD4 or anti-CD8 monoclonal antibodies.

**345. The function of autoantibody known as long-acting thyroid stimulator factor is...**

*Variants of answer:*

- a) stimulation of lactation;
- b) T-lymphocyte activation;
- c) cytotoxic effect against thyroid cells;
- d) cytotoxic effect in lateral amiotrophic sclerosis;
- e) activation of thyrotropin receptors in thyroid gland.

**346. Thymus dysgenesis is...**

*Variants of answer:*

- a) DiGeorge syndrome;
- b) Bruton's syndrome;
- c) Ataxia – telangiectasia;
- d) Graves' disease;
- e) Wiskott – Aldrich syndrome.

**347. Allergy mediator is...**

*Variants of answer:*

- a) pepsin;
- b) trypsin;
- c) thyrotropin;
- d) prostaglandin;
- e) laminin.

**348. T-cell mitogen is...**

*Variants of answer:*

- a) hemagglutinin;
- b) phytohemagglutinin;
- c) agglutinin;
- d) agglutinogen;
- e) LPS.

**349. Delayed type of hypersensitivity develops in...**

*Variants of answer:*

- a) 1 hr;

- b) 3 hrs;
- c) 6 hrs;
- d) 16 hrs;
- e) 1–3 days.

**350. Immune complex-mediated hypersensitivity is characterized by...**

*Variants of answer:*

- a) receptor stimulation;
- b) receptor blockade;
- c) basophil degranulation;
- d) direct activation of T and B cells;
- e) vasculitis development.

**351. Agammaglobulinemia is...**

*Variants of answer:*

- a) DiGeorge syndrome;
- b) Graves' disease;
- c) Bruton's syndrome;
- d) Wiskott – Aldrich syndrome;
- e) Quincke's disease.

**352. Tularin skin test evaluates...**

*Variants of answer:*

- a) 1<sup>st</sup> type of hypersensitivity;
- b) 2<sup>nd</sup> type of hypersensitivity;
- c) 3<sup>rd</sup> type of hypersensitivity;
- d) 4<sup>th</sup> type of hypersensitivity;
- e) 5<sup>th</sup> type of hypersensitivity.

**353. Type of hypersensitivity characterized by antibody-dependent cell cytotoxicity (ADCC) is called...**

*Variants of answer:*

- a) anaphylactic hypersensitivity;
- b) cytotoxic hypersensitivity;
- c) immune complex-mediated hypersensitivity;
- d) cell-mediated hypersensitivity;
- e) autoimmune reaction.

**354. Serum sickness develops according to...**

*Variants of answer:*

- a) cell-mediated hypersensitivity;
- b) IgE-mediated reactions;

- c) anti-receptor reactions;
- d) immune complex-mediated reactions;
- e) ADCC.

**355. BCG vaccine is used for...**

*Variants of answer:*

- a) specific tuberculosis prophylaxis;
- b) skin testing in tuberculosis;
- c) tuberculosis chemotherapy;
- d) specific tuberculosis treatment;
- e) serologic diagnosis of tuberculosis.

**356. The autoantigen characteristic of rheumatoid arthritis is...**

*Variants of answer:*

- a) nicotinamide adenine dinucleotide phosphate oxidase oxidase;
- b) osteon;
- c) hyaluronic acid;
- d) DNA-protein complex;
- e) Fc fragment of IgG.

**357. NBT test evaluates...**

*Variants of answer:*

- a) respiratory burst in phagocytes;
- b) B cell and T cell proliferation;
- c) phagocyte number;
- d) leukocyte migration;
- e) presentation of antigens.

**358. The following systems perform non-specific protection except...**

*Variants of answer:*

- a) the mononuclear phagocyte systems;
- b) the lymphocyte system;
- c) the complement system;
- d) the granulocyte systems;
- e) the IFN systems.

**359. For non-specific protection factors, the following statement is true:**

*Variants of answer:*

- a) act after prior contact with the antigen;
- b) act targeted, against a specific antigen;
- c) the factors are diverse ones, they act without prior contact with the antigen;
- d) are factors of the immune system;
- e) work independently, exercise immunity without other systems.

**360. Humoral factors of nonspecific protection are all ones except...**

*Variants of answer:*

- a) C-reactive protein;
- b) lysozyme;
- c) proteins of the complement system;
- d) Igs;
- e) properdin (factor P).

**361. Lysozyme is an enzyme that cleave...**

*Variants of answer:*

- a) peptidoglycan of the cell wall in Gram-positive bacteria;
- b) lysines;
- c) LPS in the cell wall of Gram-negative bacteria;
- d) peptides;
- e) membranes of macroorganism cells.

**362. Complement performs the following functions, except...**

*Variants of answer:*

- a) plays a role in the chemotaxis of phagocytes;
- b) participates in the elimination of immune complexes from the body;
- c) provides opsonization of the phagocytosis object;
- d) triggers an immune response;
- e) performs the role of anaphylatoxins in allergic reactions.

**363. IFN is:**

*Variants of answer:*

- a) a protein involved in the activation of complement by an alternative pathway;
- b) an enzyme that cleaves peptidoglycan;
- c) nonspecific factor of antiviral immunity;
- d) a protein involved in the activation of complement along the classical pathway;
- e) a substance produced by bacteria and causing the death of lymphocytes.

**364. The property that IFNs do not possess is...**

*Variants of answer:*

- a) they have an antiviral effect;
- b) they are produced by leukocytes;
- c) they provide an immunomodulatory effect;
- d) they act organotropically;
- e) they have an antiproliferative effect.

**365. Microphage cells include...**

*Variants of answer:*

- a) lymphocytes;

- b) neutrophils;
- c) monocytes;
- d) platelets;
- e) NK cells.

**366. The cells that cannot be phagocytes are...**

*Variants of answer:*

- a) alveolar macrophages;
- b) osteoclasts;
- c) red blood cells;
- d) monocytes;
- e) Kupffer cells in the liver.

**367. Opsonins may include...**

*Variants of answer:*

- a) ILs, IFNs;
- b) the antigen – antibody complex;
- c) lysozyme, transferrin;
- d) antibodies, complement components;
- e) hyaluronidase, neuraminidase.

**368. The killing of bacteria in phagocytes is carried out by the following factor(s):**

*Variants of answer:*

- a) hydroxyl radicals (OH);
- b) H<sub>2</sub>O<sub>2</sub>, singlet molecular oxygen;
- c) bactericidal nitric oxide (NO);
- d) lysozyme, cationic proteins;
- e) all the mentioned variants.

**369. The feature not typical for macrophages is...**

*Variants of answer:*

- a) participation in the immune response as an antigen-presenting cell;
- b) phagocytosis of antigens;
- c) participation in inflammatory reactions;
- d) antibody production;
- e) secretion of immune system mediators.

**370. The main immune cell types seen in an infection process in its initial phase are...**

*Variants of answer:*

- a) T lymphocytes;
- b) neutrophils;

- c) red blood cells;
- d) B lymphocytes;
- e) platelets.

**371. Cause(s) of incomplete phagocytosis is (are)...**

*Variants of answer:*

- a) violation of the fusion of the phagosome with the lysosome;
- b) the presence of an antifagocytic factor in the microorganism (e.g. capsules);
- c) blockade of lysosomal enzymes;
- d) long-term persistence of microorganisms in the cytoplasm outside the phagolysosome;
- e) all the mentioned variants.

**372. Which cytokine playing the role of an endogenous pyrogen is secreted by macrophages?**

*Variants of answer:*

- a) IFN;
- b) IL-1;
- c) IL-2;
- d) IL-4;
- e) IL-5.

**373. For NK cells it is true that they...**

*Variants of answer:*

- a) are able to recognize and destroy tumor and virus-infected cells;
- b) relate to the factors of specific protection;
- c) interact with antigens to form immune complexes;
- d) recognize antigens through their T cell receptor in conjunction with class HLA I;
- e) produce Igs.

**374. The properties of antigens do not include...**

*Variants of answer:*

- a) specificity;
- b) immunogenicity;
- c) avidity;
- d) antigenicity;
- e) foreignness.

**375. Complete antigens are the antigens that...**

*Variants of answer:*

- a) capable of causing an immune response and reacting with specific antibodies;
- b) don't induce the production of antibodies but interact with specific antibodies;

- c) don't have immunogenicity;
- d) are capable of causing an immune response but don't react with specific antibodies;
- e) don't induce an immune response and don't interact with antibodies.

**376. The group of leukocyte antigens includes...**

*Variants of answer:*

- a) Rh factor;
- b) HLA antigens;
- c) O antigens;
- g) agglutinogens of the AB0 blood group;
- e) CD antigens.

**377. The genes of the HLA system are localized in...**

*Variants of answer:*

- a) chromosome 4;
- b) chromosome 6;
- c) chromosome 9;
- d) chromosome 12;
- e) chromosome 17.

**378. The ability of an antigen to stimulate the development of a specific immune response is...**

*Variants of answer:*

- a) affinity;
- b) specificity;
- c) avidity;
- d) immunogenicity;
- e) toxigenicity.

**379. Antigenic mimicry is...**

*Variants of answer:*

- a) a set of epitopes that cause the strongest immune response;
- b) a phenomenon, in which microbes of various species and humans have common antigens similar in structure;
- c) the reaction of the body upon repeated ingestion of antigens;
- d) the phenomenon when antigens under normal conditions don't cause an immune reaction;
- e) multivalence of the antigen.

**380. Specific protection is performed by...**

*Variants of answer:*

- a) the immune (lymphoid) system;

- b) the system of mononuclear phagocytes;
- c) complement protein system;
- d) lysozyme,  $\beta$ -lysine, lactoferrin;
- e) the granulocyte system.

**381. Antigen-independent differentiation of B lymphocytes takes place in...**

*Variants of answer:*

- a) red bone marrow;
- b) peripheral lymph nodes;
- c) thymus;
- d) spleen;
- e) tonsils.

**382. Antigen-independent differentiation of T lymphocytes takes place in...**

*Variants of answer:*

- a) tonsils;
- b) lymphoid formations of the appendix;
- c) thymus;
- d) spleen;
- e) red bone marrow.

**383. Molecules formed as a result of a humoral immune response are...**

*Variants of answer:*

- a) allergens;
- b) antigens;
- c) anatoxins;
- d) antibodies;
- e) complement components.

**384. The cells that produce antibodies are...**

*Variants of answer:*

- a) macrophages;
- b) plasma cells;
- c) T lymphocytes;
- d) neutrophils;
- e) mast cells.

**385. IgG is characterized by all the listed features except...**

*Variants of answer:*

- a) pass through the placenta;
- b) it is produced with a secondary immune response;
- c) the presence in the blood in the form of monomers;
- d) it is sensitive to cysteine;
- e) it is contained in the blood serum in the highest concentration.

**386. The Ig molecule consists of...**

*Variants of answer:*

- a) two heavy and four light polypeptide chains;
- b) two heavy and two light polypeptide chains;
- c) epitope and Fc fragment;
- d)  $\alpha$ - and  $\beta$ -chains;
- e) two polypeptide chains an epitope and a *hinge region*.

**387. Immune complexes are formed during interaction of...**

*Variants of answer:*

- a) components of the complement system;
- b) T-cell receptor and CD3 molecules;
- c) antigens with antibodies;
- d) opsonins with macrophage receptors;
- e) molecules of the main histocompatibility complex.

**388. By their chemical structure antibodies are...**

*Variants of answer:*

- a) lipids;
- b) glycoproteins;
- c) peptidoglycans;
- d) carbohydrates;
- e) LPSs.

**389. The precursors of antibody-producing cells are...**

*Variants of answer:*

- a) macrophages;
- b) T helpers;
- c) granulocytes;
- d) B lymphocytes;
- e) T killers.

**390. IgG is...**

*Variants of answer:*

- a) monomer;
- b) dimer;
- c) trimer;
- d) pentamer;
- e) polymer.

**391. IgE is characterized by...**

*Variants of answer:*

- a) providing local immunity;

- b) penetration through the placenta into the fetus;
- c) binding the complement;
- d) cytophilicity;
- e) producing only with a secondary immune response.

**392. Igs of different classes differ from each other...**

*Variants of answer:*

- a) light chains;
- b) fragments of Fab;
- c) heavy chains;
- d) Fc fragment;
- e) the “hinge” area.

**393. The valence of antibodies is...**

*Variants of answer:*

- a) the number of aminoacid residues in the hypervariable site;
- b) the number of H chains;
- c) the concentration of antibodies in the blood serum;
- d) the number of Ig molecules interacting with one antigenic determinant;
- e) the number of active centers capable of reacting with the antigen in the Ig molecule.

**394. Local immunity is provided by the following Ig:**

*Variants of answer:*

- a) IgA;
- b) IgM;
- c) IgD;
- d) IgE;
- e) IgG.

**395. With a cellular immune response, the T-effector cell recognizes...**

*Variants of answer:*

- a) the antigen – antibody complex;
- b) only the antigen;
- c) antigen via its T-cell receptor in complex with HLA class I molecules;
- d) antigen via its T-cell receptor in complex with HLA class II molecules;
- e) complement components.

**396. The mechanisms of elimination of immune complexes from the body as a result of a humoral immune response do not include...**

*Variants of answer:*

- a) immune phagocytosis;
- b) destruction of antigens by T killers;

- c) antibody-dependent cellular cytotoxicity;
- d) complement activation by the classical pathway;
- e) destruction of the antigen – antibody complex by K cells.

**397. Specify immunocompetent cells with cytotoxicity.**

*Variants of answer:*

- a) T helpers;
- b) B lymphocytes;
- c) T killers;
- d) cells with CD4 molecules on their membranes;
- e) plasma cells.

**398. Immunobiological drugs include...**

*Variants of answer:*

- a) vaccines;
- b) immune serums;
- c) Ig preparations;
- d) immunomodulators;
- e) all the mentioned variants.

**399. For active immunoprophylaxis response options are used such response options as...**

*Variants of answer:*

- a) serums;
- b) antitoxins;
- c) vaccines;
- d) antibiotics;
- e) Ig preparations.

**400. For passive immunoprophylaxis are used such response options as...**

*Variants of answer:*

- a) anatoxins;
- b) antibacterial drugs;
- c) vaccines;
- d) immune serums;
- e) adjuvants.

**401. A vaccine containing live attenuated bacteria is used for specific prevention of...**

*Variants of answer:*

- a) botulism;
- b) tetanus;
- c) poliomyelitis;

- d) diphtheria;
- e) tuberculosis.

**402. The principle of transferring genes controlling the necessary antigenic determinants into the genome of other microorganisms that begin to synthesize the corresponding antigen is used in the creation of the following vaccines:**

*Variants of answer:*

- a) chemical vaccines;
- b) anti-idiotypic vaccines;
- c) genetic engineering vaccines;
- d) attenuated vaccines;
- e) inactivated vaccines.

**403. A vaccine is used for specific measles prevention is...**

*Variants of answer:*

- a) genetically engineered vaccine;
- b) live vaccine;
- c) killed vaccine;
- d) chemical vaccine;
- e) adsorbed vaccine.

**404. Vaccines with an adjuvant are called...**

*Variants of answer:*

- a) adsorbed vaccines;
- b) recombinant vector vaccines;
- c) inactivated vaccines;
- d) anatoxins;
- e) live attenuated vaccines.

**405. Killed vaccines are obtained...**

*Variants of answer:*

- a) from strains of microorganisms with high immunogenicity, which are inactivated by physical or chemical methods;
- b) by treating exotoxins with 0.4 % formalin solution;
- c) based on anti-idiotypic antibodies;
- d) by reducing the virulence of microorganisms when they are cultivated under unfavorable conditions;
- e) on the basis of an adjuvant.

**406. Mandatory routine vaccination is carried out for the prevention of...**

*Variants of answer:*

- a) tetanus;
- b) dysentery;

- c) anthrax;
- d) tick-borne encephalitis;
- e) tularemia.

**407. For serotherapy of infectious diseases are used...**

*Variants of answer:*

- a) anatoxins;
- b) chemotherapy drugs;
- c) immune serums;
- d) vaccines;
- e) antibiotics.

**408. Homologous immune serums are obtained...**

*Variants of answer:*

- a) by hyperimmunization of horses with the appropriate anatoxin;
- b) based on anti-idiotypic antibodies;
- c) by treating exotoxins with 0.4 % formalin solution;
- d) from immunized people from donor and placental blood;
- e) by hyperimmunizing rabbits with the appropriate antigen.

**409. Antitoxic serums are obtained...**

*Variants of answer:*

- a) by treating exotoxins with 0.4 % formalin solution;
- b) by hyperimmunizing horses with the appropriate toxoid;
- c) based on anti-idiotypic antibodies;
- d) by hyperimmunizing rabbits with the appropriate microorganism;
- e) when passing microorganisms through the body of immune animals.

**410. A complication of serotherapy does not include...**

*Variants of answer:*

- a) serum sickness;
- b) allergic reactions of type I;
- c) postvaccinal encephalitis;
- d) anaphylactic shock;
- e) Arthus reaction.

**411. The immunity formed after an infectious disease is called...**

*Variants of answer:*

- a) natural passive immunity;
- b) artificial active immunity;
- c) artificial passive immunity;
- d) natural active immunity;
- e) hereditary (specific) immunity.

**412. Serotyping is...**

*Variants of answer:*

- a) determination of specific antibodies in the patient's serum using a known antigen;
- b) determination of the serotype of a microorganism using a known antigenic diagnosticum;
- c) identification of an unknown culture of a microorganism using a known diagnostic serum;
- d) detection of unknown antibodies in the patient's serum using an erythrocyte antigenic diagnosticum;
- e) determination of antibodies in the patient's serum using diagnostic serum.

**413. Serodiagnostics is...**

*Variants of answer:*

- a) detection of specific antibodies in the patient's serum using a known monoreceptor serum;
- b) determination of unknown antibodies in the patient's serum using a known antigenic diagnosticum;
- c) determination of the type of microbe isolated from the patient;
- d) diagnosis of an infectious disease with the determination of microbial antigens in the patient's serum;
- e) determination of the serovar of a microorganism using a known monoreceptor serum.

**414. The criterion of serodiagnostics is...**

*Variants of answer:*

- a) diagnostic titer;
- b) determination of unknown microbial antigens;
- c) antigen titer in the blood serum;
- d) determination of the serotype of the microorganism;
- e) a positive reaction result.

**415. The purpose of serological diagnosis of diseases using paired serums is...**

*Variants of answer:*

- a) identification of pathogen antigens;
- b) detection of toxins;
- c) detection of an increase in the titer of antibodies by 4 times or more;
- d) identification of an allergic reaction;
- e) determination of the serotype of the microorganism.

**416. For serodiagnostics of infectious diseases and determination of the titer of antibodies in the patient's serum, it is taken into account...**

*Variants of answer:*

- a) minimal dilution of the patient's blood serum, in which a positive reaction result is still observed;
- b) maximum dilution of the patient's blood serum, in which a positive reaction result is still observed;
- c) diagnostic titer;
- d) maximum dilution of the patient's blood serum, in which a negative reaction result is observed;
- e) maximum dilution of the microbial suspension, in which a positive reaction result is still observed.

**417. Agglutination reactions do not include...**

*Variants of answer:*

- a) slide agglutination;
- b) RIHA;
- c) Coombs' reaction;
- d) double immunodiffusion reaction according to Ouchterlony;
- e) coagglutination reaction.

**418. Indicate a positive result of the agglutination reaction.**

*Variants of answer:*

- a) turbidity;
- b) hemolysis;
- c) color change;
- d) formation of sediment in the form of flakes;
- e) erythrocyte sedimentation in the form of a "button".

**419. Positive result of indirect hemagglutination reaction is...**

*Variants of answer:*

- a) turbidity;
- b) erythrocyte sedimentation in the form of a "button";
- c) absence of hemolysis;
- d) scalloped sediment in the form of an "umbrella";
- e) color change.

**420. Diagnostic preparation in RIHA for serodiagnostics is...**

*Variants of answer:*

- a) monoreceptor serum;
- b) erythrocyte antigenic diagnosticum;
- c) polyvalent serum;

- d) erythrocyte antibody diagnosticum;
- e) anatoxin.

**421. The positive result of the precipitation reaction in the agar gel according to Ouchterlony is...**

*Variants of answer:*

- a) hemolysis;
- b) the formation of a flake-like sediment;
- c) turbidity;
- d) formation of precipitation lines;
- e) scalloped precipitate in the form of an “umbrella”.

**422. Positive result of the Ascoli's Precipitation Test is ...**

*Variants of answer:*

- a) the appearance of precipitation lines
- b) scalloped sediment in the form of an “umbrella”;
- c) hemolysis;
- d) absence of hemolysis;
- e) formation of a precipitation ring in solution.

**423. In IFA the result is taken into account...**

*Variants of answer:*

- a) by the presence or absence of hemolysis;
- b) when studying a microscopic preparation in a luminescent microscopy;
- c) by electrophoresis;
- d) spectrophotometrically;
- e) by the formation of precipitation lines.

**424. The reaction with labeled antibodies or antigens is...**

*Variants of answer:*

- a) CFT;
- b) Coombs' test;
- c) Ascoli test;
- d) ELISA;
- e) RIHA.

**425. In IFA it is used antiserum labeled as...**

*Variants of answer:*

- a) enzyme;
- b) a radioactive isotope;
- c) orthophenylenediamine;
- d) fluorochrome;
- e) substrate H<sub>2</sub>O<sub>2</sub>.

**426. In ELISA the antigen or antibody is labeled with ...**

*Variants of answer:*

- a) fluorochrome;
- b) an enzyme;
- c) radioactive isotope;
- d) orthophenylenediamine;
- e) auramine.

**427. In RIA diagnostic serums are labeled with...**

*Variants of answer:*

- a) radioactive isotopes;
- b) fluorochrome;
- c) an enzyme;
- d) auramine;
- e) chromogen.

**428. For serodiagnostics of an infectious disease with the help of ELISA, all the listed components are necessary, except...**

*Variants of answer:*

- a) the patient's serum;
- b) a known antigenic test system;
- c) antigen-specific serum;
- d) anti-Ig serum labeled with peroxidase;
- e) substrate H<sub>2</sub>O<sub>2</sub>.

**429. Immune diagnostic serums are used for...**

*Variants of answer:*

- a) treatment of viral infections;
- b) serodiagnostics of infectious diseases;
- c) antitoxic therapy;
- d) serological identification of microorganisms;
- e) serotherapy of bacterial infections.

**430. Antiviral immunity is characterized by the participation of...**

*Variants of answer:*

- a) IFN;
- b) cytotoxic T lymphocytes;
- c) antibodies;
- d) NK cells;
- e) all the mentioned variants.

**431. Allergy is...**

*Variants of answer:*

- a) a specific increased primary immune reaction of the body to an allergen;

- b) a nonspecific reaction of the body, which is accompanied by tissue damage;
- c) a specific increased secondary immune reaction to an allergen, which is accompanied by tissue damage;
- d) the reaction of hyposensitivity of the body;
- e) the reaction of the body associated with a violation of cell proliferation the immune system and the synthesis of Igs. The reaction of the body is associated with a violation of the proliferation of the immune system cells and the synthesis of Igs.

**432. The state of hypersensitivity of the body is called...**

*Variants of answer:*

- a) anergic reaction;
- b) sensitization;
- c) tolerance;
- d) immunological memory;
- e) nonspecific resistance.

**433. The antigen that causes sensitization in a sensitive organism is called as...**

*Variants of answer:*

- a) immunogen;
- b) CD antigen;
- c) allergen;
- d) tolerogen;
- e) biogen.

**434. Allergens can be...**

*Variants of answer:*

- a) medicinal products;
- b) animal hair;
- c) food products;
- d) pollen of plants;
- e) all the mentioned variants.

**435. Immediate type hypersensitivity is mediated by...**

*Variants of answer:*

- a) antibodies;
- b) macrophages;
- c) allergens;
- d) T lymphocytes;
- e) red blood cells.

**436. Delayed-type hypersensitivity involves...**

*Variants of answer:*

- a) erythrocytes;

- b) T-effector cells;
- c) plasmocytes;
- d) antibodies;
- e) B lymphocytes.

**437. Type I immediate hypersensitivity allergic reactions is called as...**

*Variants of answer:*

- a) cytotoxic;
- b) antireceptor;
- c) immunocomplex;
- d) cellular;
- e) anaphylactic.

**438. Hypersensitivity reaction develops...**

*Variants of answer:*

- a) during primary contact with the antigen;
- b) only in persons with immunodeficiency;
- c) when the complement is activated only by an alternative path;
- d) with repeated exposure to the antigen;
- e) with the development of a state of immunological tolerance.

**439. For type I immediate type of hypersensitivity is characterized by the participation of...**

*Variants of answer:*

- a) macrophages;
- b) cytotoxic T lymphocytes;
- c) IgE;
- d) complement;
- e) IgM.

**440. IgE has tropism to...**

*Variants of answer:*

- a) lymphocytes;
- b) mast cells;
- c) microbial cells;
- d) fibroblasts;
- e) NK cells.

**441. Atopy is...**

*Variants of answer:*

- a) the reaction of the immune system to its own autologous molecules;
- b) the state of immunological tolerance;
- c) hereditary predisposition to hypersecretion of IgE to certain antigens;

- d) immunodeficiency condition;
- e) nonspecific resistance of the organism.

**442. The phenomenon of immunological tolerance (immunotolerance) is used for...**

*Variants of answer:*

- a) organ and tissue transplantation;
- b) allergy treatment;
- c) suppression of autoimmune reactions;
- d) treatment of endocrine insufficiency;
- e) all the mentioned variants.

**443. Immunological tolerance is...**

*Variants of answer:*

- a) immunity of the body to pathogens of infectious diseases;
- b) the reaction of the immune system to its own autologous molecules;
- c) the non-response of the immune system to certain antigens;
- d) the state of nonspecific resistance of the body;
- e) hypersensitivity of the body to antigens.

**444. An allograft is...**

*Variants of answer:*

- a) the donor's own tissue transplanted to him;
- b) tissue transplanted from an animal to a human;
- c) an organ or tissue transplanted to a representative of another species;
- d) organ or tissue transplanted to individuals of the same species;
- e) tissue transplanted to an identical twin.

**445. The method(s) used to suppress transplant immunity during tissue or organ transplantation is (are) ...**

*Variants of answer:*

- a) selection of donors according to the MHC-antigen system;
- b) the use of immunosuppressants;
- c) creating tolerance;
- d) use of anti-lymphocytic serum;
- e) all the mentioned variants.

**446. The immune status is...**

*Variants of answer:*

- a) the body's immunity to pathogens of infectious diseases;
- b) the structural and functional state of the individual's immune system determined by a set of clinical and laboratory immunological indicators;
- c) the state of immunological tolerance;

- d) decreased immune response due to a defect in one link of the immune system;
- e) the state of collective immunity among the population.

**447. The test of the first level of assessment of the immune status is not...**

*Variants of answer:*

- a) determination of subpopulations of T lymphocytes;
- b) the number of white blood cells;
- c) the level of IgM, IgG, IgA in the blood serum;
- d) phagocytic activity of leukocytes in the blood;
- e) the number of T and B lymphocytes.

**448. The first level tests of the immune status assessment allow...**

*Variants of answer:*

- a) to identify genetically determined diseases of the immune system;
- b) to select donors in accordance with the MHC-antigen system;
- c) to identify gross defects of the immune system;
- d) to clarify the nature of the defect of the immune system;
- e) to make a final immunological diagnosis.

**449. The methods of assessing the immune status include the definition of...**

*Variants of answer:*

- a) indicators of cellular immunity;
- b) complement system factors;
- c) indicators of humoral immunity;
- d) indicators of the phagocyte system;
- e) all the mentioned variants.

**450. When assessing the immune status, determining the indicators of humoral immunity do not carry out...**

*Variants of answer:*

- a) determination of the number of B lymphocytes in peripheral blood;
- b) detection of Ig content of various classes in blood serum;
- c) determination of T lymphocytes subpopulations;
- g) determination of circulating immune complexes;
- e) determination of the functional activity of B lymphocytes using the blast transformation reaction to B cell mitogen.

**451. Reactions and methods of quantitative assessment of lymphocytes do not include...**

*Variants of answer:*

- a) radial immunodiffusion (Manchini's test);
- b) flow cytometry;
- c) the method of rosette formation;

- d) IFA;
- e) methods based on the use of monoclonal antibodies to CD markers.

**452. When assessing the cellular level of the immune status, do not use ...**

*Variants of answer:*

- a) determination of the number of mature T lymphocytes;
- b) evaluation of the ratio of CD4+/CD8+ lymphocytes (immunoregulatory index);
- c) determination of the reaction of T lymphocytes to phytohemagglutinin activation in the blast transformation reaction;
- d) determination of the number of B lymphocytes in the blood and the content of Ig of various classes in the blood serum;
- e) determination of the number of subpopulations of T lymphocytes – T helper and cytotoxic T lymphocytes.

**453. Antitumor immunity is provided by...**

*Variants of answer:*

- a) NK cells;
- b) T killers;
- c) ADCC;
- d) IFNs;
- e) all the mentioned variants.

**454. An autoimmune reaction is...**

*Variants of answer:*

- a) decrease or complete absence of an immune response;
- b) the reaction of the immune system to its own antigens;
- c) nonspecific reaction of the immune system to microbial antigens;
- d) development of the state of immunological tolerance;
- e) the state of nonspecific resistance.

**455. The mechanisms of development of an autoimmune reaction include...**

*Variants of answer:*

- a) the development of an immune response to cross-reacting antigens;
- b) binding of foreign antigen by body cells and their transformation into carriers of foreign epitopes;
- c) the release of endoantigens in acute trauma normally isolated from the immune system by barriers;
- d) disorder of regulation of the immune system;
- e) all the mentioned variants.

**456. An immunodeficiency condition is...**

*Variants of answer:*

- a) the state of immunological tolerance;
- b) a decrease or complete absence of an immune response due to a defect in one or more parts of the immune system;
- c) a specific increased secondary immune reaction to the antigen accompanied by tissue damage;
- d) the state of nonspecific resistance of the body;
- e) the reaction of the immune system to its own antigens.

**457. Primary immunodeficiency is characterized by...**

*Variants of answer:*

- a) damage to the normal immune system;
- b) defeat only the humoral link of the immune system;
- c) a genetically determined disease of the immune system;
- d) its occurrence in case of tumor diseases, irradiation, exposure to drugs;
- e) damage of only nonspecific resistance factors.

**458. Secondary immunodeficiency may occur after...**

*Variants of answer:*

- a) viral infections;
- b) treatment with immunosuppressants;
- c) the effects of physical factors (radiation, etc.);
- d) severe injuries, surgical interventions;
- e) all the mentioned variants.

**459. The characteristics of secondary immunodeficiency include such option as...**

*Variants of answer:*

- a) they occur when the genome is damaged in the embryonic period;
- b) in all patients only the cellular link of the immune system is affected;
- c) they are genetically determined diseases of the immune system;
- d) they are caused by damage to the normal immune system;
- e) only the humoral link of the immune system is affected.

**460. The source of infection in zoonosis is...**

*Variants of answer:*

- a) contaminated hands;
- b) contaminated foodstuff;
- c) animal;
- d) human;
- e) water.

**461. A disease with a sharp increase and limited in time and territory is called...**

*Variants of answer:*

- a) sporadic;
- b) outbreak;
- c) epidemy;
- d) endemia;
- e) pandemia.

**462. Nature of exotoxin is...**

*Variants of answer:*

- a) lipid;
- b) LPS;
- c) polysaccharide;
- d) nucleic acid derivative;
- e) protein.

**463. Invasive factors include...**

*Variants of answer:*

- a) oxydase;
- b) hyaluronidase;
- c) pili;
- d) fimbria;
- e) flagella.

**464. Bacteremia means that...**

*Variants of answer:*

- a) bacteria enter the blood stream but not multiply there;
- b) bacteria enter the blood stream being able to propagate in blood;
- c) bacteria are able to propagate in the blood with purulent foci formation;
- d) bacteria produce toxins in blood;
- e) bacteria persist in blood cells, e.g. phagocytes.

**465. Artificial mechanism of disease transmission is provided by...**

*Variants of answer:*

- a) airborne route;
- b) water route;
- c) vectors;
- d) insect bites;
- e) parenteral injections.

**466. The source of infection in anthroponoses is...**

*Variants of answer:*

- a) animal;

- b) contaminated hands;
- c) human;
- d) rodent;
- e) contaminated dishes.

**467. Disease spread restricted in some locality is called...**

*Variants of answer:*

- a) sporadic;
- b) outbreak;
- c) epidemic;
- d) endemia;
- e) pandemic.

**468. Nature of endotoxin is...**

*Variants of answer:*

- a) protein-metal complex;
- b) polysaccharide;
- c) LPS;
- d) short-chain peptide;
- e) nucleoprotein.

**469. Septicemia means that...**

*Variants of answer:*

- a) bacteria enter the blood stream but not multiply there;
- b) bacteria enter the blood stream being able to propagate in blood;
- c) bacteria are able to propagate in the blood with purulent foci emergence;
- d) bacteria produce toxins in the blood;
- e) bacteria persist in organs or tissues.

**470. Contact route of disease transmission is provided by...**

*Variants of answer:*

- a) airborne route;
- b) water route;
- c) vectors;
- d) sexual intercourse;
- e) insect bites.

**471. Pathogenic activity of injectisome as function of bacterial type III secretion system is...**

*Variants of answer:*

- a) antibiotic secretion;
- b) targeted delivery of virulence factors (effector proteins) into affected cell;
- c) excretion of bacterial wastes (scavenging function);

- d) transfer of bacterial nucleic acids into target cell;
- e) electrolyte and water exchange.

**472. The potential ability of a microorganism to cause an infectious process in a macroorganism sensitive to it is...**

*Variants of answer:*

- a) toxigenicity;
- b) aggressiveness;
- c) pyrogenicity;
- d) pathogenicity;
- e) adhesion.

**473. Artificial reduction of the virulence of a microorganism is called...**

*Variants of answer:*

- a) neutralization;
- b) attenuation;
- c) inactivation;
- d) disinfection;
- e) sterilization.

**474. The process of adsorption of microorganisms on the receptors of sensitive cells of the macroorganism is called...**

*Variants of answer:*

- a) invasion;
- b) adhesion;
- c) colonization;
- d) aggression;
- e) toxemia.

**475. Exotoxins produce...**

*Variants of answer:*

- a) Gram-negative bacteria;
- b) Gram-positive bacteria;
- c) Gram-positive and Gram-negative bacteria;
- d) viruses;
- e) prions.

**476. Endotoxins are present only in...**

*Variants of answer:*

- a) Gram-negative bacteria;
- b) Gram-positive bacteria;
- c) Gram-positive and Gram-negative bacteria;
- d) viruses;
- e) prions.

**477. Exotoxins inactivated by formalin, which have lost their toxicity but have retained their immunogenicity, are called...**

*Variants of answer:*

- a) antitoxins;
- b) haptens;
- c) anatoxins (toxoids);
- d) tolerogens;
- e) cytotoxins.

**478. The measure of pathogenicity and phenotypic feature of a particular strain of microorganisms is...**

*Variants of answer:*

- a) toxicity;
- b) toxigenicity;
- c) virulence;
- d) pathogenicity;
- e) aggressiveness.

**479. The qualitative characteristic of a species determined by its genotype and the potential ability of the pathogen to cause an infectious process is...**

*Variants of answer:*

- a) toxicity;
- b) toxigenicity;
- c) virulence;
- d) pathogenicity;
- e) aggressiveness.

**480. The properties of exotoxins do not include:**

*Variants of answer:*

- a) they are released into the external environment;
- b) they are thermolabile enzymatic proteins;
- c) they are neutralized with formalin;
- d) they do not cause a strong specific immune response and synthesis of neutralizing antibodies;
- e) they have strict specifics of the action.

**481. The properties of endotoxins do not include:**

*Variants of answer:*

- a) they are released when bacteria are destroyed;
- b) they are a part of the cell wall of Gram-negative bacteria;
- c) they are neutralized with formalin;
- d) they do not cause a strong specific immune response and synthesis of neutralizing antibodies;
- e) they have a pyrogenic effect.

**482. Membranotoxins include...**

*Variants of answer:*

- a) enterotoxin;
- b) dermonecrotin;
- c) leucocidin;
- d) erythrogenin;
- e) neurotoxin.

**483. The number of microbes or toxins causing the death of 100 % of laboratory animals is called...**

*Variants of answer:*

- a) dosis letalis minima (Dlm);
- b) lethalis dosis (LD90);
- c) dosis certa letalis (Dcl);
- d) infectious dose (ID);
- e) lethalis dosis (LD50).

**484. The smallest amount of live microbes or toxins causing the death of 95 % of laboratory animals is called...**

*Variants of answer:*

- a) Dlm;
- b) LD90;
- c) Dcl;
- d) ID;
- e) LD50.

**485. The biological (experimental) method of research is...**

*Variants of answer:*

- a) obtaining a pure culture of microorganisms in an artificial nutrient medium;
- b) study of the morphology of microorganisms;
- c) reproduction of the infectious process on sensitive laboratory animals;
- d) identification of microorganisms using immune diagnostic serums;
- e) study of the biochemical properties of microorganisms.

**486. A long incubation period, a steadily progressive course and a fatal outcome are characteristics of...**

*Variants of answer:*

- a) chronic infection;
- b) slow infection;
- c) autoinfection;
- d) latent infection;
- e) superinfection.

**487. The period of an infectious disease from the moment of infection until the first signs of the disease appear is called ...**

*Variants of answer:*

- a) prodromal period;
- b) incubation period;
- c) clinical manifestations;
- d) chronic period of the disease;
- e) convalescence.

**488. The blood (blood-contact) mechanism includes the following ways of infection transmission:**

*Variants of answer:*

- a) parenteral mode;
- b) transplacental mode;
- c) water-borne mode;
- d) food-borne mode;
- e) airborne mode.

**489. The fecal-oral mechanism includes the following modes of infection transmission:**

*Variants of answer:*

- a) airborne mode;
- b) wound mode;
- c) alimentary mode;
- d) percutaneous mode;
- e) sexual mode.

**490. Aerogenic mechanism includes the following mode of infection transmission:**

*Variants of answer:*

- a) water-borne mode;
- b) by droplets;
- c) parenteral mode;
- d) contact mode;
- e) percutaneous mode.

**491. The infection portal of entry for the transmissive mechanism of transmission is...**

*Variants of answer:*

- a) gastrointestinal tract;
- b) upper respiratory tract;
- c) blood;
- d) skin;
- e) mucous membranes.

**492. Bacteriological diagnosis of sepsis is the isolation of...**

*Variants of answer:*

- a) coproculture;
- b) hemoculture;
- c) urine culture;
- d) biliculture;
- e) all the mentioned variants.

**493. Finding microorganisms in a macroorganism without clinical manifestations of infection is...**

*Variants of answer:*

- a) microbocarriage;
- b) superinfection;
- c) reconvalescence;
- d) generalized infection;
- e) reinfection.

**494. An infection, in which there is a repeated infection with the same pathogen against the background of the current disease, is called...**

*Variants of answer:*

- a) reinfection;
- b) secondary infection;
- c) superinfection;
- d) relapse;
- e) autoinfection.

**495. Repeated disease due to endogenous infection is...**

*Variants of answer:*

- a) superinfection;
- b) relapse;
- c) reinfection;
- d) mixinfection;
- e) autoinfection.

**496. Prolonged presence of a microorganism in a macroorganism in an inactive state is called...**

*Variants of answer:*

- a) persistence;
- b) bacteremia;
- c) relapse;
- d) reconvalescence;
- e) superinfection.

**497. Reinfection is...**

*Variants of answer:*

- a) a repeated infection with the same microbe after full recovery;
- b) the appearance of signs of the same disease caused by the pathogen remaining in the body after apparent recovery;
- c) a new infectious process caused by another microbe joins the existing infectious process;
- d) an infectious disease caused by one type of pathogen;
- e) prolonged presence of microorganisms in the body in an inactive state.

**498. Infections caused by medical procedures are called...**

*Variants of answer:*

- a) anthroponoses;
- b) superinfections;
- c) iatrogenic infections;
- d) opportunistic infections;
- e) focal infections.

**499. Characteristics of infectious diseases include...**

*Variants of answer:*

- a) etiology;
- b) contagiousness;
- c) epidemic;
- d) specificity of transmission mechanisms;
- e) all the mentioned variants.

**500. The outcomes of the disease include all the listed options, except...**

*Variants of answer:*

- a) recovery;
- b) chronization;
- c) carrier;
- d) monoinfection;
- e) death.

**CHAPTER 3**  
**MEDICAL BACTERIOLOGY. MEDICAL MYCOLOGY**  
**AND PARASITOLOGY**

*Choose one correct answer*

**501. Typical morphology of staphylococci is...**

*Variants of answer:*

- a) Gram-negative micrococci;
- b) Gram-positive long chains;
- c) Gram-positive grape-like assembled cocci;
- d) Gram-negative tetrads;
- e) Gram-positive bundle of cocci.

**502. Selective medium for *S. aureus* is...**

*Variants of answer:*

- a) yolk-salt agar;
- b) blood agar;
- c) McConkey's agar;
- d) Kitt – Tarozzi medium;
- e) milk agar.

**503. Respiration type of *Pseudomonas aeruginosa* is ...**

*Variants of answer:*

- a) optional anaerobe;
- b) microaerophilic;
- c) aerotolerant;
- d) obligate aerobic;
- e) obligate anaerobe.

**504. Mechanism of staphylococcal beta-hemolysin action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) superantigen;
- c) membrane-affecting enzyme;
- d) inhibitor of cellular protein synthesis;
- e) metal-dependent protease.

**505. Mechanism of staphylococcal toxic shock syndrome toxin action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) activator of secondary intracellular messengers;

- c) inhibitor of cellular protein synthesis;
- d) metal-dependent protease;
- e) superantigen.

**506. Specific infection caused by *S. aureus* is...**

*Variants of answer:*

- a) staphylococcal abscess;
- b) staphylococcal scalded skin syndrome;
- c) staphylococcal septicemia;
- d) staphylococcal osteomyelitis;
- e) staphylococcal phlegmona.

**507. Incorrect statement is that...**

*Variants of answer:*

- a) *Pseudomonas aeruginosa* is a widespread nosocomial pathogen;
- b) *Pseudomonas aeruginosa* produces potent exotoxins;
- c) *Pseudomonas aeruginosa* readily survives in the environment;
- d) *Pseudomonas aeruginosa* ferments glucose;
- e) *Pseudomonas aeruginosa* displays extremely high resistance to antibiotics.

**508. The enzyme absent in anaerobes is...**

*Variants of answer:*

- a) dehydrogenase;
- b) penicillinase;
- c) phospholipase;
- d) oxidase;
- e) hyaluronidase.

**509. Most suitable antibiotic for anaerobic infection treatment is...**

*Variants of answer:*

- a) tetracycline;
- b) gentamycin;
- c) clindamycin;
- d) erythromycin;
- e) biseptol.

**510. Type of immunity appeared after anti-staphylococcal Ig administration is...**

*Variants of answer:*

- a) artificial active immunity;
- b) artificial passive immunity;
- c) natural active immunity;
- d) natural passive immunity;
- e) nonsterile immunity.

**511. Genetic alteration in methicillin-resistant *Staphylococcus aureus* (MRSA) *Staphylococcus* is...**

*Variants of answer:*

- a) acquisition of beta-lactamase genes;
- b) acquisition of R-plasmid;
- c) alteration of genes controlling antibiotic efflux;
- d) phase variation of genes encoding peptidoglycan synthesis;
- e) carriage of gene encoding low-affinity *PBP2a* transpeptidase.

**512. Typical morphology of *Pseudomonas aeruginosa* is...**

*Variants of answer:*

- a) Gram-negative non-motile rods;
- b) Gram-positive motile rods;
- c) Gram-negative streptobacteria;
- d) Gram-negative monotrichate bacteria;
- e) Gram-positive motile bacteria.

**513. All the listed staphylococci are coagulase-negative except...**

*Variants of answer:*

- a) *S. aureus*;
- b) *S. saprophyticus*;
- c) *S. epidermidis*;
- d) *S. schleifeiri*;
- e) *S. hominis*.

**514. Selective medium for *Pseudomonas aeruginosa* is...**

*Variants of answer:*

- a) blood agar;
- b) yolk-salt agar;
- c) bile salt agar;
- d) McConkey's agar;
- e) acetamide agar.

**515. Mechanism of staphylococcal alpha-toxin action is...**

*Variants of answer:*

- a) superantigen;
- b) pore-forming toxin;
- c) activator of secondary intracellular messengers;
- d) inhibitor of cellular protein synthesis;
- e) metal-dependent protease.

**516. Mechanism of *Pseudomonas aeruginosa* exotoxin A action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) superantigen;
- c) inhibitor of cellular protein synthesis;
- d) activator of secondary intracellular messengers;
- e) metal-dependent protease.

**517. Severe infection caused by *S. epidermidis* is...**

*Variants of answer:*

- a) pneumonia in farmers;
- b) wound infections in surgical patients;
- c) endocarditis in patients with prosthetic devices;
- d) periostitis in soccer players;
- e) scalded skin syndrome in newborns.

**518. Bacterial pigment essential for *Pseudomonas aeruginosa* is...**

*Variants of answer:*

- a) carotenoid pigment;
- b) pyocyanin;
- c) quinone pigment;
- d) prodigiosin;
- e) none of the mentioned variants.

**519. Laboratory method for rapid diagnosis of anaerobic infections is...**

*Variants of answer:*

- a) hemagglutination inhibition test;
- b) anaerobic jar cultivation;
- c) blood agar cultivation;
- d) gas-liquid chromatography;
- e) immune electrophoresis.

**520. Anti-pseudomonadal penicillin is...**

*Variants of answer:*

- a) penicillin G;
- b) ampicillin;
- c) amoxicillin;
- d) oxacillin;
- e) mezlocillin.

**521. Most active bacteroidal pathogen is...**

*Variants of answer:*

- a) *B. Fragilis*;

- b) *B. ovatus*;
- c) *B. vulgatus*;
- d) *B. thetaiotaomicron*;
- e) *B. pyogenes*.

**522. Antibiotic for treatment of MRSA infection is...**

*Variants of answer:*

- a) ceftazidime;
- b) vancomycin;
- c) oxacillin;
- d) amoxicillin;
- e) ticarcillin.

**523. Typical morphology of streptococci is...**

*Variants of answer:*

- a) Gram-negative micrococci;
- b) Gram-negative diplococci;
- c) Gram-positive chains;
- d) Gram-positive grape-like assembled cocci;
- e) Gram-positive tetrads.

**524. *S. pneumoniae* belongs to such Lancefield group as...**

*Variants of answer:*

- a) A;
- b) B;
- c) H;
- d) D;
- e) none of the mentioned variants.

**525. Causative agent of caries is...**

*Variants of answer:*

- a) *S. pyogenes*;
- b) *S. agalactiae*;
- c) *S. mutans*;
- d) *S. sanguis*;
- e) *E. fecalis*.

**526. Essential test for *S. agalactiae* is...**

*Variants of answer:*

- a) esculin fermentation;
- b) inulin fermentation;
- c) beta-hemolysis;

- d) Christie – Atkins – Munch – Peterson (CAMP) test;
- e) catalase test.

**527. Mechanism of streptococcal pyrogenic exotoxins A and C action is...**

*Variants of answer:*

- a) pore-forming toxins;
- b) activators of secondary intracellular messengers;
- c) superantigens;
- d) inhibitors of cellular protein synthesis;
- e) metal-dependent protease.

**528. Major mechanism of streptococcal M protein action is...**

*Variants of answer:*

- a) superantigen;
- b) impairment of streptococci opsonization;
- c) hydrolysis of human IgG;
- d) activation of tissue metalloproteases;
- e) cell membrane damage.

**529. Serologic diagnosis of streptococcal infections is performed by...**

*Variants of answer:*

- a) anti-pyrogenic toxin test;
- b) anti-M protein test;
- c) anti-lipoteichoic acid test;
- d) anti-streptolysin O test;
- e) capsule swelling reaction.

**530. Medium for cultivation of *C. tetani* is...**

*Variants of answer:*

- a) Kitt – Tarozzi medium;
- b) McConkey medium;
- c) bile agar;
- d) eosyne-methylene blue agar;
- e) milk agar.

**531. Survival time for clostridial spores in the environment is...**

*Variants of answer:*

- a) 1 week;
- b) 1 month;
- c) several months;
- d) about 1 year;
- e) more than 1 year.

**532. Clostridia producing forming capsule is...**

*Variants of answer:*

- a) *C. novyi*;
- b) *C. septicum*;
- c) *C. histolyticum*;
- d) *C. perfringens*;
- e) *C. tetani*.

**533. Specific treatment of gas gangrene is...**

*Variants of answer:*

- a) antibiotic treatment;
- b) surgical treatment;
- c) antiprotease treatment;
- d) antitoxin treatment;
- e) hyperbaric oxygenation.

**534. Typical morphology of Clostridium perfringens is...**

*Variants of answer:*

- a) Gram-negative non-motile sporeforming rods;
- b) Gram-positive non-motile sporeforming rods;
- c) Gram-positive motile sporeforming rods;
- d) Gram-positive streptobacteria;
- e) Gram-negative motile bacteria.

**535. Group B Streptococcus is...**

*Variants of answer:*

- a) *S. agalactiae*;
- b) *S. pyogenes*;
- c) *S. mutans*;
- d) *S. sanguis*;
- e) *E. fecalis*.

**536. Essential biochemical property for streptococci is...**

*Variants of answer:*

- a) catalase negative;
- b) esculin fermentation;
- c) coagulase positive;
- d) potent proteolytic activity;
- e) CAMP test.

**537. Mechanism of C. perfringens alpha-toxin action is...**

*Variants of answer:*

- a) superantigen;

- b) guanylate cyclase activation;
- c) inhibitor of cellular protein synthesis;
- d) metal-dependent protease;
- e) enzyme with phospholipase activity.

**538. Mechanism of streptococcal pyrogenic exotoxin B action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) IL-1-affecting cystein proteinase;
- c) superantigen;
- d) activator of secondary intracellular messengers
- e) inhibitor of cellular protein synthesis.

**539. Specific infection caused by *S. pyogenes* is...**

*Variants of answer:*

- a) hospital-acquired pneumonia;
- b) erysipelas;
- c) wound infection;
- d) meningitis;
- e) scalded skin syndrome.

**540. Major mechanism responsible for rheumatic heart disease development is...**

*Variants of answer:*

- a) streptococcal hemolysin action;
- b) specific streptococcal proteolysis of heart tissues;
- c) molecular mimicry of streptococcal M protein with heart tissue substances;
- d) streptodornase action resulting in cell DNA hydrolysis;
- e) direct cell membrane damage.

**541. Laboratory method for determination of tetanus toxin strength is...**

*Variants of answer:*

- a) slide agglutination;
- b) CFT;
- c) neutralization reaction;
- d) molecular hybridization;
- e) PCR.

**542. DTP vaccine is composed of...**

*Variants of answer:*

- a) tetanus, pertussis and diphtheria toxoids;
- b) killed group D streptococci, killed pertussis bacteria, tetanus toxoid;

- c) killed bacteria of tetanus, pertussis and diphtheria;
- d) killed pertussis bacteria, tetanus and diphtheria toxoids;
- e) killed pneumococci, tetanus and diphtheria toxoids.

**543. Antibacterial medication(s) for treatment of enterococcal infections is (are) ...**

*Variants of answer:*

- a) combination of vancomycin and aminoglycosides;
- b) fluoroquinolones;
- c) chloramphenicol;
- d) doxycycline;
- e) combination of cephalosporins and tetracyclines.

**544. Part of emergency tetanus therapy is...**

*Variants of answer:*

- a) introduction of anatoxin;
- b) introduction of antitoxic antibodies;
- c) antibiotic treatment;
- d) infusion detoxification therapy;
- e) sedative therapy.

**545. Typical morphology of *E. coli* is...**

*Variants of answer:*

- a) Gram-positive motile rods;
- b) Gram-negative motile rods;
- c) Gram-negative non-motile rods;
- d) Gram-positive non-motile rods;
- e) Gram-negative motile diplobacteria.

**546. *Shigella* genus comprises all the listed below species except...**

*Variants of answer:*

- a) *S. dysenteriae*;
- b) *S. flexneri*;
- c) *S. boydii*;
- d) *S. derby*;
- e) *S. sonnei*.

**547. Antigen composition of *E. coli* is...**

*Variants of answer:*

- a) O-antigens only;
- b) O- and H-antigens;
- c) O-, H-, and K-antigens;

- d) O-, H-, K- and Vi-antigens;
- e) O- and K-antigens.

**548. Growth characteristics of *E. coli* on eosin methylene blue agar (EMB) agar are...**

*Variants of answer:*

- a) dark blue lactose-positive colonies;
- b) red lactose-positive colonies;
- c) transparent lactose-negative colonies;
- d) pinkish lactose-positive colonies;
- e) dark blue lactose-negative colonies.

**549. Mechanism of verotoxin action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) superantigen;
- c) activator of secondary intracellular messengers;
- d) proteolytic activity;
- e) inhibitor of cellular protein synthesis.

**550. Most frequent of *E. coli* opportunistic infections is...**

*Variants of answer:*

- a) cystitis or pyelonephritis;
- b) appendicitis;
- c) cholecystitis;
- d) meningitis;
- e) septicemia.

**551. The specific adhesion factor of pathogenic *E. coli* is...**

*Variants of answer:*

- a) CD14;
- b) intimin;
- c) bacterial LPS;
- d) selectin;
- e) integrin.

**552. *Shigella* virulence is predominantly encoded by...**

*Variants of answer:*

- a) nucleoid;
- b) temperate bacteriophage;
- c) small plasmid;
- d) large plasmid;
- e) transfected DNA from external source.

**553. Microbial properties allowing the correct identification of colienteritis causative agents are...**

*Variants of answer:*

- a) morphology;
- b) growth characteristics;
- c) biochemical properties;
- d) antibiotic resistance;
- e) antigenic properties.

**554. Appropriate antibiotic drug for shigellosis treatment is...**

*Variants of answer:*

- a) benzyl-penicillin;
- b) linezolid;
- c) vancomycin;
- d) ciprofloxacin;
- e) cefalexin.

**555. Most severe complication of enterohemorrhagic *E. coli* infections is...**

*Variants of answer:*

- a) acute heart failure;
- b) hemolytic uremic syndrome with acute renal failure;
- c) massive water loss;
- d) electrolyte disorders;
- e) septicemia.

**556. Typical morphology of shigellae is...**

*Variants of answer:*

- a) Gram-negative non-motile rods;
- b) Gram-positive motile rods;
- c) Gram-positive non-motile rods;
- d) Gram-negative non-motile rods with spores;
- e) Gram-negative motile bacteria.

**557. Enterobacteria representatives include all the listed below genera except...**

*Variants of answer:*

- a) *Klebsiella*;
- b) *Yersinia*;
- c) *Moraxella*;
- d) *Morganella*;
- e) *Providencia*.

**558. Typical biochemical property for all enterobacteria is...**

*Variants of answer:*

- a) lactose fermentation;
- b) potent proteolytic activity;
- c) carbohydrate fermentation with acid and gas production;
- d) catalase negative;
- e) oxidase negative.

**559. Antigen composition of *S. flexneri* is...**

*Variants of answer:*

- a) O-antigens only;
- b) O- and H-antigens;
- c) O-, H-, and K-antigens;
- d) O- and K-antigens;
- e) O-, H-, K- and Vi-antigens.

**560. Antigenic formula of the most aggressive enterohemorrhagic *E. coli* is...**

*Variants of answer:*

- a) *E. coli* O111 : H8;
- b) *E. coli* O26 : H2;
- c) *E. coli* O55 : H10;
- d) *E. coli* O104 : H3;
- e) *E. coli* O157 : H7.

**561. Mechanism of *E. coli* enterotoxin action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) superantigen;
- c) activator of secondary intracellular messengers;
- d) inhibitor of cellular protein synthesis;
- e) metal-dependent protease.

**562. Pathogenic *E. coli* causing dysentery-like diseases are...**

*Variants of answer:*

- a) enteropathogenic *E. coli*;
- b) enterohemorrhagic *E. coli*;
- c) uropathogenic *E. coli*;
- d) enteroaggregative *E. coli*;
- e) enterotoxigenic *E. coli*.

**563. Minimal infectious dose for enterohemorrhagic *E. coli* infection is...**

*Variants of answer:*

- a) 1–100 cells;

- b) 100–300 cells;
- c) 300–1000 cells;
- d) several thousands cells;
- e) 100 thousands and more cells.

**564. *Shigella* that cause the most of water-born outbreaks is...**

*Variants of answer:*

- a) *S. dysenteriae*;
- b) *S. flexneri*;
- c) *S. boydii*;
- d) *S. sonnei*;
- e) any species is the potential agent of massive water-born outbreaks of shigellosis.

**565. Futile method for laboratory diagnostics of shigellosis is...**

*Variants of answer:*

- a) bright-field microscopy; light microscopy;
- b) planting on McConkey agar;
- c) Russel's medium culturing;
- d) determination of antigenic properties;
- e) determination of carbohydrate fermentation.

**566. Molecular mechanism ensuring shigella intercellular lateral spread is...**

*Variants of answer:*

- a) cellular membrane engulfment;
- b) transportation by phagocytes;
- c) vacuole formation;
- d) actin comet formation;
- e) flagella movement.

**567. Typical morphology of salmonellae is...**

*Variants of answer:*

- a) Gram-negative non-motile rods;
- b) Gram-positive non-motile rods;
- c) Gram-positive motile rods;
- d) Gram-negative motile rods;
- e) Gram-negative comma-shaped bacteria.

**568. One of the most common causative agents of salmonellosis with gastroenteritis is...**

*Variants of answer:*

- a) *S. Typhi*;
- b) *S. Paratyphi C*;

- c) *S. Enteritidis*;
- d) *S. boydii*;
- e) *S. London*.

**569. Factor of salmonella virulence released after microbial degradation is...**

*Variants of answer:*

- a) LPS;
- b) flagellin;
- c) secretory proteins;
- d) enterotoxin;
- e) Vi-antigen.

**570. Growth characteristics of salmonellae on McConkey agar are...**

*Variants of answer:*

- a) red lactose-positive colonies;
- b) dark blue lactose-positive colonies;
- c) pinkish lactose-positive colonies;
- d) dark blue lactose-negative colonies;
- e) transparent lactose-negative colonies.

**571. Representatives of salmonella, unable to produce hydrogen sulfide, are...**

*Variants of answer:*

- a) *S. Typhimurium*;
- b) *S. Paratyphi A*;
- c) *S. Paratyphi B*;
- d) *S. Typhi*;
- e) *S. Anatum*.

**572. Kauffmann – White scheme of salmonella serotyping comprises...**

*Variants of answer:*

- a) group determination according to specific O-antigen fraction followed by species identification by first phase of H-Ag;
- b) group determination according to specific O-antigen fraction followed by species identification by second phase of H-Ag;
- c) group determination according to common O-antigen fraction followed by species identification by second phase of H-Ag;
- d) group determination according to specific phase of H-antigen followed by species identification by specific O-antigen fraction;
- e) group determination according to specific O-antigen fraction followed by species identification by Vi-antigen.

**573. The macrophage receptor interacting with endotoxin LPS is...**

*Variants of answer:*

- a) CD14;
- b) CD11a/CD18;
- c) CD16;
- d) CD32;
- e) CD35.

**574. The material for microbial examination that should be taken at the first week of enteric typhoid fever is...**

*Variants of answer:*

- a) stool;
- b) urine;
- c) bone marrow;
- d) cerebrospinal fluid;
- e) blood.

**575. Laboratory test for detection of salmonella carriers is...**

*Variants of answer:*

- a) Widal's test tube agglutination;
- b) cultural method;
- c) luminescent microscopy;
- d) indirect Vi-hemagglutination test;
- e) Kauffmann – White agglutination test.

**576. Elevated level of antibodies in enteric fever convalescent patients results from...**

*Variants of answer:*

- a) anti-Vi-Ag antibodies;
- b) anti-O-Ag antibodies more than anti-H-Ag antibodies;
- c) anti-H-Ag antibodies more than anti-O-Ag antibodies;
- d) anti-K-Ag antibodies;
- e) anti-enterotoxin antibodies.

**577. Vaccine currently used for enteric typhoid fever prophylaxis is...**

*Variants of answer:*

- a) inactivated cellular vaccine;
- b) chemical Vi-Ag-based vaccine;
- c) chemical O-Ag-based vaccine;
- d) typhoid toxoid;
- e) DNA vaccine.

**578. The bacteria most similar in morphology to salmonella are ...**

*Variants of answer:*

- a) *Pseudomonads*;
- b) *Klebsiellae*;
- c) *Shigellae*;
- d) *Escherichiae*;
- e) *Bacilli*.

**579. Salmonella serovar that predominantly cause septicemia in infants is...**

*Variants of answer:*

- a) *S. Derby*;
- b) *S. Anatum*;
- c) *S. Choleraesuis*;
- d) *S. Moscow*;
- e) *S. Typhimurium*.

**580. Salmonella, capable of fermenting lactose to form acidic end products, is...**

*Variants of answer:*

- a) *S. Typhi*;
- b) *S. Typhimurium*;
- c) *S. Paratyphi A*;
- d) *S. Paratyphi B*;
- e) *S. Enteritidis*.

**581. Antigen composition of S. Typhi is...**

*Variants of answer:*

- a) O-antigen only;
- b) O- and H-antigens;
- c) O-, H- and sometimes Vi-antigens;
- d) O-, H-, K- and Vi-antigens;
- e) O- and K-antigens.

**582. Mechanism of salmonella enterotoxin action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) superantigen;
- c) activator of enterocyte adenylate cyclase;
- d) inhibitor of enterocyte protein synthesis;
- e) enzymes of invasion.

**583. Salmonella injectisomes are encoded by...**

*Variants of answer:*

- a) bacterial transposons;

- b) bacterial chromosome;
- c) bacterial episome;
- d) bacterial plasmids;
- e) virulent bacteriophages.

**584. Inner organ harboring *S. Typhi* after disease is...**

*Variants of answer:*

- a) bladder;
- b) gallbladder;
- c) intestine;
- d) Peyer's patches;
- e) spleen.

**585. Minimal infectious dose for *S. typhi* is...**

*Variants of answer:*

- a)  $10^2$  cells;
- b)  $10^3$  cells;
- c)  $10^5$  cells;
- d)  $10^7$  cells;
- e)  $10^9$  cells.

**586. Selective medium for salmonella is...**

*Variants of answer:*

- a) sugar broth;
- b) EMB agar;
- c) McConkey agar;
- d) bismuth sulfite agar;
- e) Endo's medium.

**587. Serological criteria for acute enteric fever infection is...**

*Variants of answer:*

- a) serum titer of antibodies to O-Ag is 1/50, titer of antibodies to H-Ag – 1/200;
- b) serum titer of antibodies to O-Ag is 1/40, titer of antibodies to H-Ag – 1/40;
- c) serum titer of antibodies to O-Ag is 1/400, titer of antibodies to H-Ag – 1/200;
- d) serum titer of antibodies to O-Ag is 1/100, titer of antibodies to H-Ag – 1/100;
- e) serum titer of antibodies to Vi-Ag is 1/40.

**588. The preferred antibiotic for the treatment of typhoid fever is...**

*Variants of answer:*

- a) chloramphenicol;
- b) penicillin;
- c) macrolides;
- d) tetracyclines;
- e) fluoroquinolones.

**589. Typical morphology of cholera causative agent is...**

*Variants of answer:*

- a) Gram-positive motile spiral agent;
- b) Gram-negative motile peritrichous bacteria;
- c) Gram-negative comma-like monotrichous bacteria;
- d) Gram-positive motile comma-shaped agent;
- e) Gram-negative motile spore-forming rod.

**590. O139 vibrio can evade population immunity owing to ...**

*Variants of answer:*

- a) alteration of LPS-coding genetic cluster;
- b) H-antigen phase change;
- c) capsule uptake;
- d) loss of toxin production;
- e) antigenic mimicry.

**591. Main factor of cholera vibrio virulence is ...**

*Variants of answer:*

- a) endotoxin;
- b) LPS;
- c) hyaluronidase;
- d) enterotoxin;
- e) neurotoxin.

**592. Growth characteristic of yersiniae on Endo's medium is ...**

*Variants of answer:*

- a) pinkish lactose-positive colonies;
- b) transparent lactose-negative colonies;
- c) red lactose-positive colonies;
- d) dark blue lactose-positive colonies;
- e) deep red lactose-negative colonies.

**593. Biochemical test that makes possible to differentiate Enterobacteriaceae and Vibrionaceae members is ...**

*Variants of answer:*

- a) lactose fermentation;
- b) indole production;
- c) catalase activity;
- d) oxidase activity;
- e) sucrose fermentation.

**594. Vibrio receptor for cholera toxin phage is ...**

*Variants of answer:*

- a) toxin-coregulated pili;

- b) O139 LPS;
- c) type III pili;
- d) needle complex;
- e) mannose-sensitive hemagglutinin.

**595. Mechanism of *C. botulinum* neurotoxin action is...**

*Variants of answer:*

- a) pore-forming toxin affecting neuronal membranes;
- b) superantigen affecting neuronal membranes;
- c) activator of secondary intracellular messengers;
- d) inhibitor of synaptic protein synthesis;
- e) specific protease destroying synaptic proteins.

**596. Infectious dose for *V. cholera* is...**

*Variants of answer:*

- a)  $10^2$  cells;
- b)  $10^3$  cells;
- c)  $10^4$  cells;
- d)  $10^5$  cells;
- e)  $10^6$  cells or more.

**597. The best growth temperature for yersiniae cultivation is...**

*Variants of answer:*

- a) 4 °C;
- b) 25 °C;
- c) 37 °C;
- d) 42 °C;
- e) 45 °C.

**598. Vaccine used for specific prophylaxis of yersinioses is...**

*Variants of answer:*

- a) inactivated vaccine;
- b) attenuated live vaccine;
- c) chemical vaccine;
- d) sub-unit vaccine;
- e) none of the mentioned variants.

**599. Urgent treatment of botulism is...**

*Variants of answer:*

- a) antibiotics administration;
- b) injections of polyvalent antitoxic sera;
- c) toxoid administration;

- d) infusion therapy for detoxication;
- e) urgent vaccination.

**600. *C. botulinum* resembles...**

*Variants of answer:*

- a) comma;
- b) drumstick;
- c) barrel;
- d) tennis racket;
- e) lancet.

**601. Typical morphology of *Y. pseudotuberculosis* is...**

*Variants of answer:*

- a) Gram-negative non-motile rods;
- b) Gram-positive non-motile rods;
- c) Gram-positive motile rods;
- d) Gram-negative motile rods;
- e) curved or branched acid-fast bacteria.

**602. *Cholera vibrio* becomes virulent owing to...**

*Variants of answer:*

- a) bacterial transformation;
- b) temperate phage transduction;
- c) illegitimate recombination;
- d) frame-shift mutation;
- e) microbial modification.

**603. Antigenic composition of *V. cholera* is...**

*Variants of answer:*

- a) O-antigen;
- b) O- and H-antigens;
- c) O-, H- and K-antigens;
- d) S-, R- and H-antigens;
- e) O- and K-antigens.

**604. Selective medium for cholera vibrios is...**

*Variants of answer:*

- a) EMB agar;
- b) Endo's medium;
- c) Muller broth;
- d) yolk-salt agar;
- e) thiosulfate-citrate-bile salts-sucrose (TCBS) agar.

**605. Life-threatening complication of cholera is...**

*Variants of answer:*

- a) watery diarrhea;
- b) lowering of body's temperature;
- c) hypovolemic shock;
- d) encephalitis;
- e) secondary infection.

**606. The final for cholera diagnosis is...**

*Variants of answer:*

- a) sucrose fermentation;
- b) TCBS growth;
- c) oxidase test;
- d) positive indole test;
- e) agglutination test with O1 and O139 antisera.

**607. *Y. pseudotuberculosis* virulence is predominantly encoded by...**

*Variants of answer:*

- a) plasmid with pathogenicity island;
- b) nucleoid with pathogenicity island;
- c) transposon;
- d) temperate bacteriophage;
- e) DNA from external source with pathogenicity island.

**608. Minimal sterilization regimen ensuring complete botulotoxin inactivation is...**

*Variants of answer:*

- a) heating at 56 °C for 30 min;
- b) heating at 80 °C for 30 min;
- c) boiling for 1 min;
- d) boiling for 5 min;
- e) boiling for 10 min or more.

**609. Urgent treatment of cholera is...**

*Variants of answer:*

- a) antitoxic sera injections;
- b) antibacterial drug administration;
- c) compensatory infusion therapy;
- d) toxoid administration;
- e) urgent vaccination.

**610. Specific symptom(s) indicating manifested botulism onset is (are)...**

*Variants of answer:*

- a) diarrhea;

- b) severe headache, dizziness;
- c) vomiting, nausea;
- d) swallowing troubles, aphonia, diplopia;
- e) dry mouth.

**611. Morphology of meningococci is...**

*Variants of answer:*

- a) Gram-positive long chains;
- b) Gram-positive bean-shaped diplococci;
- c) Gram-negative bean-shaped diplococci;
- d) Gram-negative short chains;
- e) Gram-negative irregular cocci.

**612. Medium for *B. pertussis* cultivation is...**

*Variants of answer:*

- a) McConkey medium;
- b) Bordet – Gengou agar;
- c) Kitt – Tarozzi medium;
- d) peptone broth;
- e) Sabouraud agar.

**613. Major virulence factor of *B. pertussis* is...**

*Variants of answer:*

- a) filamentous hemagglutinin;
- b) capsule;
- c) pertussis endotoxin;
- d) pertussis exotoxin;
- e) hemolysin.

**614. Meningococcal serogroup is determined by...**

*Variants of answer:*

- a) outer membrane protein antigen;
- b) LPS antigen;
- c) IgA proteases;
- d) antigen of pili;
- e) capsular antigen.

**615. Most suitable clinical investigated material for whooping cough laboratory diagnosis is...**

*Variants of answer:*

- a) "cough plate" sample;
- b) saline nasal wash;

- c) sputum;
- d) nasopharyngeal swab;
- e) blood.

**616. Major virulence factor of meningococci is...**

*Variants of answer:*

- a) endotoxin;
- b) exotoxin;
- c) fimbria;
- d) capsule;
- e) hyaluronidase.

**617. Colonies of mycoplasma resemble...**

*Variants of answer:*

- a) dew drops;
- b) mercury globules;
- c) "fried eggs";
- d) "hard-boiled eggs";
- e) daisy flowers.

**618. A symptom indicating the appearance of meningococemia is...**

*Variants of answer:*

- a) high fever;
- b) rigidity of occipital muscles;
- c) severe headache;
- d) petechial rash;
- e) leukocyte presence in cerebrospinal fluid.

**619. Drug of choice for meningococcal cerebrospinal meningitis treatment is...**

*Variants of answer:*

- a) gentamicin;
- b) chloramphenicol;
- c) doxycycline;
- d) benzyl-penicillin;
- e) azithromycin.

**620. Specific prophylaxis of whooping cough is carried out by...**

*Variants of answer:*

- a) patient's isolation;
- b) human Ig administration;
- c) pertussis toxoid;

- d) BCG vaccine;
- e) DTP vaccine (cellular or acellular).

**621. Most common form of meningococcal infection is...**

*Variants of answer:*

- a) meningococcal nasopharyngitis;
- b) meningococcal carriage;
- c) meningococcal meningitis;
- d) meningococemia;
- e) meningococcal pneumonia.

**622. Typical morphology of whooping cough causative agent is...**

*Variants of answer:*

- a) Gram-negative oval-shaped capsulated small rods;
- b) Gram-positive non-spore-forming rods;
- c) Gram-positive bacilli;
- d) Gram-negative spore-forming capsulated rods;
- e) Gram-negative bean-shaped diplococci.

**623. Essential morphological property for mycoplasmas is...**

*Variants of answer:*

- a) small sizes;
- b) intracellular persistence;
- c) lack of cell wall;
- d) pleomorphic pathogens;
- e) bacterial motility.

**624. Medium for meningococcal cultivation is...**

*Variants of answer:*

- a) McConkey medium;
- b) peptone broth;
- c) Kitt – Tarozzi medium;
- d) serum agar;
- e) Sabouraud agar.

**625. Pertussis toxin action is...**

*Variants of answer:*

- a) intracellular protease activity;
- b) adenosine diphosphate (ADP) ribosylating activity with activation of secondary cellular messengers;
- c) disruption of cell membrane;
- d) protein synthesis inhibition;
- e) increase of vascular permeability.

**626. Meningococcal serotype is determined by...**

*Variants of answer:*

- a) capsular antigen;
- b) lipooligosaccharide antigen;
- c) IgA protease;
- d) outer membrane protein antigen;
- e) cytoplasmic antigen.

**627. Respiratory type of bordetellas is...**

*Variants of answer:*

- a) strict anaerobes;
- b) obligate aerobes;
- c) facultative anaerobes;
- d) microaerophils;
- e) aerotolerant bacteria.

**628. Predominant source of meningococcal infections is...**

*Variants of answer:*

- a) carrier;
- b) sick person;
- c) sick animal;
- d) patient with meningococemia;
- e) patient's nasal secretion.

**629. Minimal significant rise of specific antibody titers for laboratory diagnosis of mycoplasmal pneumonia in paired sera test is...**

*Variants of answer:*

- a) twofold;
- b) fourfold;
- c) eightfold;
- d) tenfold;
- e) more than 10 times.

**630. Most sensitive method for laboratory diagnosis of mycoplasma infections is...**

*Variants of answer:*

- a) immune fluorescence;
- b) microscopy;
- c) cultural method;
- d) PCR;
- e) serological method.

**631. Polysaccharide quadrivalent vaccine provides immunity against meningococci of all the listed groups except...**

*Variants of answer:*

- a) A group;
- b) B group;
- c) C group;
- d) Y group;
- e) W135 group.

**632. Antibiotic group for treatment of mycoplasmal infections is...**

*Variants of answer:*

- a) beta-lactams;
- b) linezolid;
- c) aminoglycosides;
- d) glycopeptides;
- e) azalides.

**633. Medium for rapid detection of *M. tuberculosis* growth is...**

*Variants of answer:*

- a) Finn medium;
- b) Middlebrook agar;
- c) BACTEC automated culture system;
- d) Soton's medium;
- e) Lowenstein – Jensen's medium.

**634. *Mycobacterium* that cause mycobacterioses is...**

*Variants of answer:*

- a) *M. bovis*;
- b) *M. leprae*;
- c) *M. smegmatis*;
- d) *M. avium-intracellulare*;
- e) *M. africanum*.

**635. Acid-fastness of tubercle bacilli depends on...**

*Variants of answer:*

- a) thick cell wall;
- b) mycolic acid presence;
- c) teichoic acid presence;
- d) LPS presence;
- e) capsule presence.

**636. Essential test for virulent *M. tuberculosis* is...**

*Variants of answer:*

- a) cord-factor synthesis;

- b) nitrate reduction;
- c) urease production;
- d) catalase-positive test;
- e) growth on salicylate-containing media.

**637. Chemical structure of tuberculin purified protein derivative is...**

*Variants of answer:*

- a) protein-polysaccharide complex;
- b) polysaccharide complex;
- c) mycolic acids;
- d) waxes and phosphatides;
- e) protein complex.

**638. *C. diphtheriae* looks like...**

*Variants of answer:*

- a) club-shaped rods;
- b) tennis racket;
- c) drumstick;
- d) bamboo cane;
- e) ovoid rods.

**639. Medium for culturing of *C. diphtheriae* is...**

*Variants of answer:*

- a) Lowenstein – Jensen’s medium;
- b) Clauberg II medium;
- c) McConkey agar;
- d) Middlebrook agar;
- e) Bordet – Gengou medium.

**640. Essential property for virulent *C. diphtheriae* is...**

*Variants of answer:*

- a) cystinase production;
- b) hyaluronidase production;
- c) endotoxin presence;
- d) capsule production;
- e) exotoxin secretion.

**641. Minimal protective titer of diphtheria antitoxin in humans evaluated by indirect hemagglutination test is...**

*Variants of answer:*

- a) 1/10;
- b) 1/20;

- c) 1/40;
- d) 1/80;
- e) 1/100.

**642. BCG vaccine provides...**

*Variants of answer:*

- a) active sterile immunity;
- b) passive sterile immunity;
- c) passive non-sterile immunity;
- d) active non-sterile immunity;
- e) active anti-toxic immunity.

**643 Tuberculin skin test estimates...**

*Variants of answer:*

- a) I<sup>st</sup> type anaphylactic hypersensitivity in tuberculosis;
- b) II<sup>nd</sup> type cytotoxic hypersensitivity;
- c) III<sup>rd</sup> type immune complex-mediated hypersensitivity;
- d) IV<sup>th</sup> type cell-mediated hypersensitivity;
- e) anti-receptor autoimmune reactions.

**644. Mycobacterium that can cause tuberculosis in humans is...**

*Variants of answer:*

- a) *M. kansasii*;
- b) *M. microti*;
- c) *M. bovis*;
- d) *M. smegmatis*;
- e) *M. avium*.

**645. Egg-based medium for *M. tuberculosis* cultivation is...**

*Variants of answer:*

- a) McConkey medium;
- b) Middlebrook agar;
- c) Soton's medium;
- d) Lowenstein – Jensen's medium;
- e) automated culture system.

**646. Rosette-like *C. diphtheriae* colonies are of...**

*Variants of answer:*

- a) gravis type;
- b) mitis type;
- c) intermedius type;
- d) belfanti variant;
- e) none of the mentioned variants.

**647. Mechanism of diphtheria exotoxin action is...**

*Variants of answer:*

- a) pore-forming toxin;
- b) cytotoxic superantigen;
- c) activator of secondary intracellular messengers;
- d) metal-dependent protease with cytotoxic activity;
- e) inhibitor of cellular protein synthesis via peptide elongation cease.

**648. All the listed media are used for *C. diphtheriae* cultivation except...**

*Variants of answer:*

- a) Roux medium;
- b) Loeffler medium;
- c) Gengou medium;
- d) Clauberg II medium;
- e) Tinsdal medium.

**649. Rapidly growing mycobacteria is...**

*Variants of answer:*

- a) *M. tuberculosis*;
- b) *M. bovis*;
- c) *M. africanum*;
- d) *M. smegmatis*;
- e) *M. avium*.

**650. Neisser stain reveals...**

*Variants of answer:*

- a) capsule;
- b) volutin granules;
- c) spores;
- d) acid-fastness;
- e) intracellular persistence.

**651. Most sensitive and rapid method for diphtheria toxin detection is...**

*Variants of answer:*

- a) PCR;
- b) neutralization reaction on white mice;
- c) cell cultural test;
- d) flocculation reaction;
- e) immune diffusion.

**652. The main intervention in urgent therapy of diphtheria is...**

*Variants of answer:*

- a) toxoid administration;

- b) treatment with specific serum in sufficient doses;
- c) antibiotic treatment in sufficient doses;
- d) massive infusion therapy for detoxication;
- e) urgent DTP injections.

**653. All the listed below antibiotics are the first-row drugs for tuberculosis treatment except...**

*Variants of answer:*

- a) isoniazid;
- b) pyrazinamide;
- c) cycloserine;
- d) rifampin;
- e) streptomycin.

**654. Multiple drug resistance *M. tuberculosis* strain demonstrates...**

*Variants of answer:*

- a) resistance to pyrazinamide and streptomycin;
- b) resistance to isoniazid and streptomycin;
- c) resistance to rifampin and streptomycin;
- d) resistance to isoniazid and rifampin;
- e) resistance to rifampin and fluoroquinolones.

**655. Morphology of plague causative agent is...**

*Variants of answer:*

- a) Gram-positive rods;
- b) Gram-negative ovoid rods;
- c) Gram-positive bipolar cocci;
- d) Gram-negative long rods;
- e) Gram-negative irregular cocci.

**656. Main factor for plague transmission is...**

*Variants of answer:*

- a) flies;
- b) rats;
- c) fleas;
- d) gophers;
- e) marmots.

**657. Genetic element of *Y. pestis* virulence encoding Yop virulon is...**

*Variants of answer:*

- a) transposon;
- b) plasmid;

- c) nucleoid;
- d) bacteriophage;
- e) foreign DNA.

**658. Most frequent clinical form of anthrax is...**

*Variants of answer:*

- a) cutaneous form;
- b) gastrointestinal form;
- c) pulmonary form;
- d) septicemic form;
- e) wool-sorter's disease.

**659. Brucellae species affecting goats and sheeps is...**

*Variants of answer:*

- a) *B. suis*;
- b) *B. abortus*;
- c) *B. canis*;
- d) *B. neotomae*;
- e) *B. melitensis*.

**660. Tube dilution test for serologic diagnosis of brucellosis is...**

*Variants of answer:*

- a) Burn test;
- b) Ascoli test;
- c) Huddleson's test;
- d) Wright's test;
- e) Widal's test.

**661. Most invasive bacteria that can penetrate through intact skin is...**

*Variants of answer:*

- a) Bordetellae;
- b) Brucellae;
- c) Staphylococci;
- d) Francisellae;
- e) Yersinia.

**662. Respiratory type of francisellae is...**

*Variants of answer:*

- a) strict anaerobes;
- b) obligate aerobes;
- c) facultative anaerobes;
- d) microaerophils;
- e) aerotolerant bacteria.

**663. The tularemia skin test mainly evaluates...**

*Variants of answer:*

- a) cell-mediated delayed hypersensitivity;
- b) anaphylactic hypersensitivity;
- c) cytotoxic hypersensitivity;
- d) immune complex-mediated hypersensitivity;
- e) antibody-dependent cell cytotoxicity.

**664. Specific prophylaxis of plague is carried out by...**

*Variants of answer:*

- a) vaccine based on the Eveline strain;
- b) DTP vaccine;
- c) BCG vaccine;
- d) killed non-capsulated vaccine;
- e) recombinant vaccine.

**665. *Y. pestis* aggressively suppresses host immune response resulting in...**

*Variants of answer:*

- a) T-helper cells blockade;
- b) NK cells attrition;
- c) severe phagocytosis inhibition;
- d) thymocytes maturation stopping;
- e) incorrect antibody synthesis by plasma cells.

**666. Morphology of *B. anthracis* is...**

*Variants of answer:*

- a) Gram-positive non-spore-forming large rods;
- b) Gram-positive spore-forming capsulated large rods;
- c) Gram-positive oval-shaped capsulated cocci;
- d) Gram-negative non-spore-forming large rods;
- e) Gram-negative motile large rods.

**667. Plague form that provides human-to-human disease transmission is...**

*Variants of answer:*

- a) cutaneous form;
- b) bubonic form;
- c) pneumonic form;
- d) intestinal form;
- e) septicemic form.

**668. Property that distinguishes *Y. pestis* from *Y. pseudotuberculosis* is...**

*Variants of answer:*

- a) motility;

- b) spore presence;
- c) cell wall structure;
- d) injectisome presence;
- e) none of the mentioned variants.

**669. *B. anthracis* colonies resemble...**

*Variants of answer:*

- a) fried eggs;
- b) pearl necklace;
- c) lion mane;
- d) crumpled lace handkerchief;
- e) globules of mercury.

**670. Test for *B. anthracis* antigen detection in various investigated material (skin, hair, etc.) is...**

*Variants of answer:*

- a) indirect hemagglutination;
- b) PCR;
- c) complement fixating test;
- d) agglutination reaction;
- e) thermoprecipitation.

**671. Respiratory type of brucellae is...**

*Variants of answer:*

- a) microaerophils;
- b) obligate aerobes;
- c) facultative anaerobes;
- d) strict anaerobes;
- e) aerotolerant bacteria.

**672. Diagnostic titer of Wright's reaction is...**

*Variants of answer:*

- a) 1:10;
- b) 1:20;
- c) 1:50;
- d) 1:200;
- e) 1:320.

**673. The listed below media can be used for brucellae and francisellae cultivation except...**

*Variants of answer:*

- a) chocolate agar;
- b) serum agar with cysteine;

- c) meat-peptone agar;
- d) glucose blood agar;
- e) liver extraction agar.

**674. The listed below clinical forms are characteristics of tularemia except...**

*Variants of answer:*

- a) bubonic form;
- b) pneumonic form;
- c) oculoglandular form;
- d) ulceroglandular form;
- e) typhoidal form.

**675. Vaccine for tularemia prophylaxis is...**

*Variants of answer:*

- a) killed vaccine;
- b) subunit vaccine;
- c) live attenuated vaccine;
- d) chemical vaccine;
- e) recombinant vaccine.

**676. Molecular mechanism of anthrax lethal toxin action is...**

*Variants of answer:*

- a) membrane damage (pore-forming toxin);
- b) activation of CD95-mediated apoptosis;
- c) stimulation of adenylate cyclase resulting in tissue edema;
- d) violation of regulation of intracellular signaling of mitogen-activated protein kinase;
- e) superantigen triggering systemic inflammatory response.

**677. Morphology of gonococci is...**

*Variants of answer:*

- a) micrococci;
- b) diplococci;
- c) tetrads;
- d) streptococci;
- e) staphylococci.

**678. Morphology of *T. Pallidum* is...**

*Variants of answer:*

- a) comma-like twisted bacteria;
- b) spirochetes with large hooks on the ends;

- c) branched flagellated bacteria;
- d) twisted bacterial forms with 8–15 regular coils;
- e) spirochetes with loose irregular large coils.

**679. The mechanism of natural mycoplasmal resistance to beta-lactams is...**

*Variants of answer:*

- a) pleomorphic bacteria;
- b) slow reproduction;
- c) beta-lactamase production;
- d) cell wall absence;
- e) accelerated efflux of beta-lactams.

**680. Minimal infectious dose of treponemas that can cause syphilis is...**

*Variants of answer:*

- a) several microbial cells;
- b) about 100 cells;
- c) in the range  $10^2$ – $10^3$  cells;
- d)  $10^3$ – $10^4$  cells;
- e) more than  $10^5$  cells.

**681. The main symptom of tertiary syphilis is...**

*Variants of answer:*

- a) skin rash;
- b) gummas;
- c) Hutchinson's triad;
- d) regional lymphadenitis;
- e) hard chancre.

**682. The method for laboratory diagnosis of primary syphilis is...**

*Variants of answer:*

- a) animal inoculation;
- b) Wasserman's reaction;
- c) venereal disease research laboratory (VDRL) test;
- d) treponemal immobilization test;
- e) microscopy.

**683. Drug of choice for syphilis treatment is...**

*Variants of answer:*

- a) streptomycin;
- b) erythromycin;
- c) penicillin;
- d) vancomycin;
- e) none of the mentioned variants.

**684. Main complication of gonorrhoea is...**

*Variants of answer:*

- a) infertility;
- b) generalization of disease;
- c) immunodeficiency;
- d) endocarditis;
- e) progression of other sexually transmitted diseases.

**685. Ophthalmia neonatorum is caused by...**

*Variants of answer:*

- a) streptococci;
- b) mycoplasma;
- c) meningococci;
- d) gonococci;
- e) staphylococci.

**686. Most suitable antibiotic drugs for treatment of chlamydioses from the listed ones below are...**

*Variants of answer:*

- a) penicillins;
- b) cephalosporins;
- c) tetracyclines or macrolides;
- d) polyene antibiotics (vancomycin);
- e) glycopeptides (amphotericin B).

**687. The reason for the growing number of failures in the treatment of gonorrhoea is...**

*Variants of answer:*

- a) growing disease incidence;
- b) intracellular persistence of gonococci;
- c) incomplete phagocytosis of bacteria;
- d) increased cost of treatment;
- e) rapidly progressing gonococcal resistance to antibiotics.

**688. All the listed below traits are equal in gonococci and meningococci except...**

*Variants of answer:*

- a) Gram-negative cell wall;
- b) bean-shaped diplococci;
- c) special growth environments are required;
- d) flagella absence;
- e) capsule presence.

**689. *Gonococci can grow...***

*Variants of answer:*

- a) in anaerobic conditions;
- b) in media with bile salts;
- c) in serum or ascitic agar;
- d) in ordinary media;
- e) at room temperature.

**690. *This statement is incorrect with regard to chlamydia...***

*Variants of answer:*

- a) growing on special nutrient media;
- b) elementary bodies are the invasive form of chlamidiae;
- c) they reproduce in various cell lines;
- d) inability to synthesize ATP;
- e) doxycycline is effective in chlamydiosis treatment.

**691. *Seronegative stage of syphilis is...***

*Variants of answer:*

- a) primary stage;
- b) secondary stage;
- c) tertiary stage;
- d) latent syphilis;
- e) congenital syphilis.

**692. *The main symptom of primary syphilis is...***

*Variants of answer:*

- a) gummas;
- b) hard chancre;
- c) skin rash;
- d) CNS disorders;
- e) regional lymphadenitis.

**693. *All the listed below tests are specific ones in syphilis except...***

*Variants of answer:*

- a) fluorescent treponemal antibody absorption test;
- b) *T. pallidum* immobilization test;
- c) VDRL reaction;
- d) Wasserman's reaction with treponemal antigen;
- e) microhemagglutination test.

**694. *All the listed below tests are used for laboratory diagnosis of gonorrhoea except...***

*Variants of answer:*

- a) microscopy;

- b) serological testing;
- c) culture test;
- d) immune fluorescence;
- e) PCR.

**695. Prevention of syphilis is achieved by...**

*Variants of answer:*

- a) autovaccine administration;
- b) multiple injections of killed vaccine;
- c) vaccination with live attenuated vaccine;
- d) single dose administration of recombinant vaccine;
- e) non-specific prophylaxis.

**696. Mycoplasmas are resistant to all the listed below drugs except...**

*Variants of answer:*

- a) penicillin;
- b) ceftriaxone;
- c) vancomycin;
- d) azithromycin;
- e) amoxicillin.

**697. Method for prevention of ophthalmia neonatorum in newborns is...**

*Variants of answer:*

- a) vaccination;
- b) passive prophylaxis;
- c) systemic antibiotic treatment;
- d) eye instillations with antibiotic or antiseptic drugs;
- e) disinfection of clothes and dishes.

**698. Wasserman's reaction is based on...**

*Variants of answer:*

- a) precipitation test;
- b) microhemagglutination test;
- c) CFT;
- d) ELISA test;
- e) *T. pallidum* immobilization test.

**699. Bacterium with the most tightly packed spiral structure is...**

*Variants of answer:*

- a) *Leptospira interrogans*;
- b) *Borrelia recurrentis*;
- c) *Treponema pallidum*;

- d) *Borrelia burgdorferi*;
- e) *Spirilla minor*.

**700. The basic morphological traits features of rickettsiae are...**

*Variants of answer:*

- a) cocci;
- b) rods;
- c) bacilli;
- d) pleomorphic bacteria;
- e) thread-like forms.

**701. All the listed below borreliae can cause Lyme disease except...**

*Variants of answer:*

- a) *Borrelia garinii*;
- b) *Borrelia afzelii*;
- c) *Borrelia duttonii*;
- d) *Borrelia bissettii*;
- e) *Borrelia burgdorferi*.

**702. Brill – Zinsser’s disease is caused by...**

*Variants of answer:*

- a) *Borrelia hispanica*;
- b) *Rickettsia conorii*;
- c) *Orientia tsutsugamushi*;
- d) *Rickettsiae provazekii*;
- e) *Borrelia afzelii*.

**703. Predominant class of specific antibodies in Brill – Zinsser’s disease is...**

*Variants of answer:*

- a) IgM;
- b) IgG;
- c) IgA;
- d) IgE;
- e) IgD.

**704. The main source of infection in epidemic typhoid fever is...**

*Variants of answer:*

- a) fleas;
- b) ticks;
- c) rodents;
- d) lice;
- e) humans.

**705. The most commonly used method for diagnosis of Lyme disease is...**

*Variants of answer:*

- a) microscopy;
- b) culture isolation;
- c) PCR;
- d) animal inoculation;
- e) serologic testing.

**706. The main route of transmission for Lyme disease is...**

*Variants of answer:*

- a) via louse bite;
- b) by crushing the louse followed by rubbing the hemolymph of the louse;
- c) via tick bite;
- d) via flea bite;
- e) via rodent bite.

**707. An anthroponotic disease is...**

*Variants of answer:*

- a) leptospirosis;
- b) Rocky Mountain spotted fever;
- c) epidemic relapsing fever;
- d) endemic typhus;
- e) Lyme borreliosis.

**708. *Coxiellae* are resistant to...**

*Variants of answer:*

- a) fluoroquinolones;
- b) beta-lactams;
- c) doxycycline;
- d) azalides;
- e) macrolides.

**709. Predominant route of transmission in Q fever is...**

*Variants of answer:*

- a) air-dust or air-droplet route;
- b) contact route;
- c) parenteral route;
- d) via louse bite;
- e) water route.

**710. An obligately anaerobic bacterium is...**

*Variants of answer:*

- a) *Borrelia burgdorferi*;

- b) *Treponema pallidum*;
- c) *Leptospira interrogans*;
- d) *Rickettsiae typhi*;
- e) *Borrelia recurrentis*.

**711. An obligate intracellular parasite is...**

Variants of answer:

- a) *Borrelia persica*;
- b) *Rickettsiae provazekii*;
- c) *Treponema pallidum*;
- d) *Borrelia recurrentis*;
- e) *Leptospira interrogans*.

**712. Most preferable method for rickettsia microscopy is...**

Variants of answer:

- a) Gram's stain;
- b) Ziehl – Neelsen's stain;
- c) Gimenez stain;
- d) dark-field microscopy;
- e) Neisser's stain.

**713. Microorganism that is most resistant in the environment is...**

Variants of answer:

- a) *Coxiella burnetii*;
- b) *Borrelia recurrentis*;
- c) *Rickettsiae typhi*;
- d) *Treponema pallidum*;
- e) *Orientia tsutsugamishi*.

**714. The main source of infection in endemic typhus is...**

Variants of answer:

- a) lice;
- b) rodents;
- c) ticks;
- d) fleas;
- e) humans.

**715. Current emerging disease is...**

Variants of answer:

- a) typhoid diseases;
- b) rickettsioses from spotted fever group;
- c) epidemic relapsing fever;

- d) leptospirosis;
- e) Brill – Zinsser’s disease.

**716. The most commonly used method for diagnosis of epidemic relapsing fever is...**

*Variants of answer:*

- a) blood culture isolation;
- b) microscopy of blood;
- c) serologic testing;
- d) PCR;
- e) animal inoculation.

**717. Predominant factor that supports leptospirosis transmission is...**

*Variants of answer:*

- a) air;
- b) soil;
- c) water;
- d) dirty hands;
- e) flies.

**718. The main localization of *R. provazekii* persistence is...**

*Variants of answer:*

- a) phagocytes;
- b) renal tubules;
- c) hepatocytes;
- d) cytoplasm and nuclei of affected cells;
- e) cytoplasm of endothelial cells.

**719. The first clinical sign in Lyme disease is...**

*Variants of answer:*

- a) acrodermatitis chronica atrophicans;
- b) oligoarthritis;
- c) CNS disorders;
- d) myocarditis;
- e) erythema migrans.

**720. Post-exposure prophylaxis of Lyme disease after tick bite includes...**

*Variants of answer:*

- a) medical observation of affected person;
- b) early vaccination in 1–3 days;
- c) passive protection with human Ig;
- d) course treatment with amoxicillin or doxycycline;
- e) course treatment with sulfonamides.

**721. Medical mycology studies...**

*Variants of answer:*

- a) mycobacteria;
- b) mycoplasma;
- c) cap mushrooms;
- d) microscopic fungi;
- e) bacteria.

**722. Microscopic fungi are characterized by...**

*Variants of answer:*

- a) unicellular organisms;
- b) multicellular organisms;
- c) eukaryotes;
- d) non-photosynthetic organisms;
- e) all the mentioned variants.

**723. Cell wall element of microscopic fungi is...**

*Variants of answer:*

- a) glycolipoproteins;
- b) chitin;
- c) cellulose;
- d) lipids;
- e) all the mentioned variants.

**724. The function of the fungal cell wall...**

*Variants of answer:*

- a) providing the protection of the fungal cell from adverse effects;
- b) the barrier function between the internal contents of the cell and the external environment;
- c) providing of the shape of the fungal cell;
- d) delivery of nutrients from the environment;
- e) all the mentioned options.

**725. The biological role of sporulation in fungi is...**

*Variants of answer:*

- a) reproduction;
- b) protection from adverse factors;
- c) preservation of the species;
- d) stock of metabolic products;
- e) digestion of insoluble substances.

**726. Pathogenic fungi with true dimorphism are...**

*Variants of answer:*

- a) *Histoplasma capsulatum*;

- b) *Malassezia furfur*;
- c) *Microsporum canis*;
- d) *Trichophyton tonsurans*;
- e) all the mentioned variants.

**727. The characteristic morphological feature of *Histoplasma capsulatum* fungus is...**

*Variants of answer:*

- a) yeast cells with a polysaccharide capsule;
- b) large yeast cells with a thick cell wall;
- c) small yeast cells inside the host cell;
- d) spherules;
- e) small yeast cigar-shaped cells.

**728. A characteristic morphological feature of *Blastomyces dermatitidis* fungus is...**

*Variants of answer:*

- a) yeast cells with a polysaccharide capsule;
- b) large yeast cells with a thick cell wall;
- c) small yeast cells inside the host cell;
- d) spherules;
- e) small yeast cigar-shaped cells.

**729. The characteristic morphological feature of *Coccidioides immitis* fungus is...**

*Variants of answer:*

- a) yeast cells with a polysaccharide capsule;
- b) large yeast cells with a thick cell wall;
- c) small yeast cells inside the host cell;
- d) spherules;
- e) small yeast cigar-shaped cells.

**730. The characteristic morphological features of the fungus *Sporothrix schenckii* are...**

*Variants of answer:*

- a) yeast cells with a polysaccharide capsule;
- b) large yeast cells with a thick cell wall;
- c) small yeast cells inside the host cell;
- d) small yeast cigar-shaped cells;
- e) spherules.

**731. Pathogenicity factors of *Candida albicans* are...**

*Variants of answer:*

- a) toxins;

- b) oligosaccharides of the cell wall;
- c) invasion factors;
- d) adhesion factors;
- e) all the mentioned variants.

**732. The causative agent of inflammatory diseases of the female genitourinary system is fungi of the species...**

*Variants of answer:*

- a) *Candida albicans*;
- b) *Trichophyton rubrum*;
- c) *Cryptococcus neoformans*;
- d) *Histoplasma capsulatum*;
- e) *Malassezia furfur*.

**733. Characteristic of *Candida albicans* fungi is...**

*Variants of answer:*

- a) glucose fermentation;
- b) growth at 45 °C;
- c) formation of chlamydospores;
- d) growth in aerobic conditions;
- e) all the mentioned variants.

**734. The following statement is incorrect for the causative agent of histoplasmosis:**

*Variants of answer:*

- a) it affects not only humans, but also many species of wild and domestic animals;
- b) the causative agent is a dimorphic fungus;
- c) in natural conditions, it lives in the soil of endemic areas;
- d) it grows on simple nutrient media;
- e) infection of a healthy individual from a sick person is possible.

**735. The main mechanism of infection with histoplasmosis is...**

*Variants of answer:*

- a) aerogenic mechanism;
- b) vertical mechanism;
- c) contact mechanism;
- d) fecal-oral mechanism;
- e) parenteral mechanism.

**736. The temperature for the mycelial growth form of the fungus *Histoplasma capsulatum* is...**

*Variants of answer:*

- a) 20–28 °C;

- b) 37 °C;
- c) 45 °C;
- d) 60 °C;
- e) 55 °C.

**737. The temperature for the yeast form growth form of the fungus *Histoplasma capsulatum* is...**

*Variants of answer:*

- a) 20–28 °C;
- b) 37 °C;
- c) 45 °C;
- d) 60 °C;
- e) 55 °C.

**738. Dermatophytes include fungi of the genus...**

*Variants of answer:*

- a) *Trichophyton*;
- b) *Histoplasma*;
- c) *Candida*;
- d) *Cryptococcus*;
- e) *Piedraia*.

**739. Nosocomial infection caused by fungi is...**

*Variants of answer:*

- a) *Microsporum canis*;
- b) *Candida albicans*;
- c) *Penicillium marneffei*;
- d) *Histoplasma capsulatum*;
- e) *Malassezia furfur*.

**740. The condition for the development of candidiasis is ...**

*Variants of answer:*

- a) incorrect prescription of antibiotics;
- b) metabolic and hormonal disorders;
- c) immunodeficiency;
- d) increased skin moisture;
- e) all the mentioned variants.

**741. Perfect fungi reproduce only...**

*Variants of answer:*

- a) sexually;
- b) asexually;
- c) budding;

- d) sexually and asexually;
- e) binary division.

**742. Imperfect fungi reproduce only...**

*Variants of answer:*

- a) sexually;
- b) asexually;
- c) budding;
- d) sexually and asexually;
- e) binary division.

**743. The mode of *Entamoeba infection histolytica* is...**

*Variants of answer:*

- a) airborne mode;
- b) wound mode;
- c) alimentary mode;
- d) parenteral mode;
- e) sexual mode.

**744. In the human body *leishmania* develops...**

*Variants of answer:*

- a) intracellularly in the form of an amastigote;
- b) in the form of a blastocyst;
- c) in the form of a zygocyst;
- d) in the form of an epimastigote;
- e) in the form of a trypomastigote.

**745. Pathogenic protozoa that cause inflammatory diseases of the human genitourinary system are...**

*Variants of answer:*

- a) trichomonads;
- b) amoebas;
- c) plasmodia;
- d) trypanosomes;
- e) leishmaniae.

**746. Microbiological diagnosis of malaria includes...**

*Variants of answer:*

- a) microscopy of the blood preparation (thick drop);
- b) PCR;
- c) IFA;
- d) ELISA;
- e) all the mentioned variants.

**747. The typical pathogen of Pityriasis (Tinea) Versicolor is...**

*Variants of answer:*

- a) fungi of the genus *Candida*;
- b) fungi of the genus *Epidermophyton*;
- c) mushrooms of the genus *Malassezia*;
- d) fungi of the genus *Trichophyton*;
- e) fungi of the genus *Sporothrix*.

**748. Facultative pathogenic fungi-pathogens of mycoses are...**

*Variants of answer:*

- a) fungi of the genus *Trichophyton*;
- b) fungi of the genus *Candida*;
- c) fungi of the genus *Cryptococcus*;
- d) fungi of the genus *Microsporum*;
- e) fungi of the genus *Sporothrix*.

**749. The causative agent of deep mycoses is...**

*Variants of answer:*

- a) *Aspergillus niger*;
- b) *Blastomyces dermatidis*;
- c) *Microsporum canis*;
- d) *Piedraia hortai*;
- e) *Trichophyton tonsurans*.

**750. Nutrient medium for fungi cultivation is...**

*Variants of answer:*

- a) Kitt – Tarozzi medium;
- b) Sabouraud agar;
- c) yolk-salt agar;
- d) Zeissler's blood-sugar agar;
- e) Endo agar.

**CHAPTER 4**  
**GENERAL AND MEDICAL VIROLOGY**  
**CLINICAL MICROBIOLOGY**

*Choose one correct answer*

**751. The basic viral property is...**

*Variants of answer:*

- a) the presence of protein synthesis systems;
- b) the ability to grow on simple nutrient media;
- c) extracellular reproduction;
- d) intracellular parasitism;
- e) the absence of nucleic acid.

**752. Impossible variant of viral genome is...**

*Variants of answer:*

- a) ssRNA;
- b) dsRNA;
- c) pair of identical RNA;
- d) dsDNA;
- e) dsDNA – RNA complex.

**753. The method used for laboratory diagnosis of viral infections is...**

*Variants of answer:*

- a) immune state evaluation;
- b) paired sera serological test;
- c) inoculation into nutrient medium;
- d) biochemical properties evaluation;
- e) none of the mentioned variants.

**754. Mode of viral nucleic acid replication for positive-sense ssRNA viruses is...**

*Variants of answer:*

- a) positive-sense RNA transcribed to positive-sense RNA;
- b) positive-sense RNA transcribed to negative-sense RNA;
- c) positive-sense RNA transcribed to DNA and then to positive-sense RNA;
- d) positive-sense RNA transcribed to DNA and then to negative-sense RNA;
- e) positive-sense RNA transcribed to negative-sense RNA and then to positive-sense RNA.

**755. Mode of viral protein synthesis for negative-sense ssRNA viruses is...**

*Variants of answer:*

- a) negative-sense RNA transcribed to negative-sense RNA and then translated to the protein;

- b) negative-sense RNA transcribed to positive-sense RNA and then translated to the protein;
- c) negative-sense RNA is translated to the protein;
- d) negative-sense RNA transcribed to DNA and then translated to the protein;
- e) negative-sense RNA transcribed to DNA, next into positive-sense RNA and then translated to the protein.

**756. Suffix for viral family name is...**

*Variants of answer:*

- a) *-vira*;
- b) *-virales*;
- c) *-viridae*;
- d) *-virinae*;
- e) *-virus*.

**757. The mode of viral replication is...**

*Variants of answer:*

- a) intracellular reproduction;
- b) spore germination;
- c) fragmentation;
- d) dissociation;
- e) binary fission.

**758. Possible variant of viral symmetry type is...**

*Variants of answer:*

- a) globular symmetry;
- b) round symmetry;
- c) axial symmetry;
- d) helical symmetry;
- e) central symmetry.

**759. Virus entry involves...**

*Variants of answer:*

- a) lysis;
- b) budding;
- c) fusion;
- d) exocytosis;
- e) none of the mentioned variants.

**760. Method of viral identification is...**

*Variants of answer:*

- a) hemagglutination inhibition test;
- b) inclusion formation;

- c) cytopathic effect;
- d) hemadsorption;
- e) hemagglutination test.

**761. Supercapsid protein is...**

*Variants of answer:*

- a) flagellin;
- b) hemagglutinin;
- c) RNA polymerase;
- d) reverse transcriptase;
- e) core protein.

**762. The essential feature of viruses is...**

*Variants of answer:*

- a) the viral envelope is covered with a capsule;
- b) the need for a cellular mechanism for viral replication;
- c) cellular structure;
- d) energy production as a result of biological oxidation;
- e) the content of two types of nucleic acids.

**763. The main parameter for modern virus classification is...**

*Variants of answer:*

- a) viral size;
- b) symmetry type;
- c) nucleic acid sequence;
- d) physical and chemical properties;
- e) type of natural host.

**764. Mode of viral nucleic acid replication for negative-sense ssRNA viruses is...**

*Variants of answer:*

- a) negative-sense RNA transcribed to negative-sense RNA;
- b) negative-sense RNA transcribed to positive-sense RNA;
- c) negative-sense RNA transcribed to DNA and then to negative-sense RNA;
- d) negative-sense RNA transcribed to positive-sense RNA and then to negative-sense RNA;
- e) negative-sense RNA transcribed to DNA and then to positive-sense RNA.

**765. Mode of viral protein synthesis for positive-sense ssRNA viruses is...**

*Variants of answer:*

- a) positive-sense RNA is translated to the protein;
- b) positive-sense RNA transcribed to positive-sense RNA and then translated to the protein;

- c) positive-sense RNA transcribed to negative-sense RNA and then translated to the protein;
- d) positive-sense RNA transcribed to DNA and then translated to the protein;
- e) none of the mentioned variants.

**766. Mode of viral nucleic acid replication for retroviruses is...**

*Variants of answer:*

- a) retroviral RNA transcribed to negative-sense RNA;
- b) retroviral RNA transcribed to positive-sense RNA;
- c) retroviral RNA transcribed to DNA and then to RNA;
- d) retroviral positive RNA transcribed to negative-sense RNA and then to positive RNA;
- e) retroviral ambisense RNA positive fragments are transcribed to negative-sense RNA and then to positive RNA.

**767. Suffix for viral genus name is...**

*Variants of answer:*

- a) *-vira*;
- b) *-virales*;
- c) *-viridae*;
- d) *-virinae*;
- e) *-virus*.

**768. Impossible variant of human viral infection outcome is...**

*Variants of answer:*

- a) productive infection;
- b) latent infection;
- c) lysogenic conversion;
- d) persistent infection;
- e) cell tumor transformation.

**769. All the listed below subgroups comprise viral structural proteins except...**

*Variants of answer:*

- a) address proteins;
- b) attachment proteins;
- c) fusion proteins;
- d) viral enzymes;
- e) capsomer proteins.

**770. The origin of the cells for continuous cell cultures is...**

*Variants of answer:*

- a) primary skin fibroblast culture;

- b) monkey kidney culture;
- c) human embryo cells;
- d) human malignant cells;
- e) chicken embryo cells.

**771. Method of viral detection (viral indication) is...**

*Variants of answer:*

- a) cytopathic effect neutralization;
- b) hemadsorption inhibition;
- c) hemagglutination inhibition test;
- d) CFT;
- e) syncytium formation.

**772. Method for rapid virus identification is...**

*Variants of answer:*

- a) neutralization test;
- b) PCR;
- c) plaque formation;
- d) infection of laboratory animals;
- e) chicken embryo inoculation.

**773. Nutrient medium for cell cultures is...**

*Variants of answer:*

- a) Medium 199;
- b) Leffler medium;
- c) Endo's medium;
- d) bile broth;
- e) Soton's medium.

**774. Symplast is...**

*Variants of answer:*

- a) giant multinucleated cell;
- b) a collection of erythrocytes adsorbed on the surface of a virus-infected cell;
- c) viral inclusions in the cell;
- d) sponge-like accumulations of nervous tissue that have formed under the influence of prions;
- e) none of the mentioned variants.

**775. Express diagnostics of viral infections is based on...**

*Variants of answer:*

- a) cultivation of virus;
- b) detection of viral antigens and/or viral nucleic acids;

- c) determination of specific antibodies;
- d) determination of Ig classes;
- e) determination of the delayed-type hypersensitivity.

**776. The method of detecting the virus genome is...**

*Variants of answer:*

- a) ELISA;
- b) IFA;
- c) reaction of hemagglutination;
- d) whole genome sequencing;
- e) RIHA.

**777. Types of cell cultures are ...**

*Variants of answer:*

- a) primary types;
- b) secondary types;
- c) diploid types;
- d) continuous types;
- e) all the mentioned variants.

**778. Primary cell cultures are ...**

*Variants of answer:*

- a) human breast epithelial cells;
- b) human skin fibroblasts;
- c) tumor cell line HeLa;
- d) tumor cell line Hep-2;
- e) green monkey kidney cell lines Vero.

**779. Diploid cell cultures are ...**

*Variants of answer:*

- a) human breast epithelial cells;
- b) human skin fibroblasts;
- c) tumor cell line HeLa;
- d) tumor cell line Hep-2;
- e) green monkey kidney cell lines Vero.

**780. Continuous cell cultures are ...**

*Variants of answer:*

- a) human breast epithelial cells;
- b) human skin fibroblasts;
- c) human diploid lung fibroblasts;
- d) tumor cell line Hep-2;
- e) monkey kidney cells.

**781. Amount of passages for primary cell cultures is...**

*Variants of answer:*

- a) 1–2;
- b) 10–15;
- c) 20–25;
- d) 40–50;
- e) unlimited.

**782. Amount of passages for diploid cell cultures is...**

*Variants of answer:*

- a) 1–2;
- b) 10–15;
- c) 20–25;
- d) 40–50;
- e) unlimited.

**783. Amount of passages for continuous cell cultures is...**

*Variants of answer:*

- a) 1–2;
- b) 10–15;
- c) 20–25;
- d) 40–50;
- e) unlimited.

**784. Indication and identification in the cell cultures is carried out by...**

*Variants of answer:*

- a) cytopathic effect;
- b) plaque appearance;
- c) inclusion formation;
- d) symplast and syncytium formation;
- e) all the mentioned variants.

**785. Disjunctive type of virus reproduction means (that) ...**

*Variants of answer:*

- a) virus components (DNA and proteins of the coat) are synthesized in separate cell compartments followed by next virion assembly;
- b) viral replication occurs in special separated cell compartment;
- c) sequential (step-by-step) synthesis of viral components;
- d) repeated temporary termination of synthesis of viral proteins and nucleic acid;
- e) replication of viral nucleic acid precedes the synthesis of viral proteins.

**786. Outcome of viral infection is...**

*Variants of answer:*

- a) productive infection;
- b) persistent infection;
- c) transforming infection;
- d) latent infection;
- e) all the mentioned variants.

**787. The virus integrated into a cell genome is called as...**

*Variants of answer:*

- a) provirus;
- b) picornavirus;
- c) parvovirus;
- d) papillomavirus;
- e) polioma virus.

**788. The interaction between the virus and the cell is not carried out by...**

*Variants of answer:*

- a) productive type;
- b) phage conversion;
- c) abortive type;
- d) integrative (virogeny) type;
- e) integrative (lysogeny) type.

**789. The productive type of interaction between a virus and a cell is characterized by...**

*Variants of answer:*

- a) interruption of the infectious process in the cell at a certain stage;
- b) integration of viral DNA in the form of a provirus into the cell chromosome and coexistence;
- c) the formation of a new generation of virions;
- d) very slow viral reproduction;
- e) all the mentioned variants.

**790. The integrative type of interaction between a virus and a cell is characterized by...**

*Variants of answer:*

- a) interruption of the infectious process in the cell at a certain stage;
- b) integration of viral DNA in the form of a provirus into the cell chromosome and coexistence;
- c) the formation of a new generation of virions;
- d) very slow viral reproduction;
- e) all the mentioned variants.

**791. The abortive type of interaction between the virus and a cell is characterized by...**

*Variants of answer:*

- a) interruption of the infectious process in the cell at a certain stage;
- b) integration of viral DNA in the form of a provirus into the cell chromosome and coexistence;
- c) the formation of a new generation of virions;
- d) very slow viral reproduction;
- e) all the mentioned variants.

**792. Structural properties of Orthomyxoviridae are...**

*Variants of answer:*

- a) helical symmetry, rod-shaped form;
- b) icosahedral symmetry, brick-shaped form;
- c) helical symmetry, spherical shape;
- d) complex symmetry, spherical shape;
- e) icosahedral symmetry, rod-shaped form.

**793. Gene drift of Influenzaviruses means...**

*Variants of answer:*

- a) genetic translocations of viral structural genes;
- b) point mutations within hemagglutinin and neuraminidase genes;
- c) genetic reassortment of hemagglutinin and neuraminidase gene segments;
- d) gene transfer from avian to human host;
- e) change of influenza virus type.

**794. Antigen(s) for determination of the Influenza virus subtype (is) are...**

*Variants of answer:*

- a) core and capsid proteins;
- b) F-protein and M-protein;
- c) surface H- and N-proteins;
- d) only M-protein (matrix);
- e) polymerase and other enzymes.

**795. The type of influenza virus capable of causing pandemics is...**

*Variants of answer:*

- a) type A;
- b) type B;
- c) type C;
- d) type B and C;
- e) none of the mentioned variants.

**796. The modern subtype of human Influenzavirus A is...**

*Variants of answer:*

- a) H1N1;
- b) H3N3;
- c) H5N3;
- d) H3N4;
- e) H6N5.

**797. Primary reproduction of Influenza virus occurs...**

*Variants of answer:*

- a) in the epithelial cells of the respiratory tract;
- b) in the cells of the lymph nodes of the respiratory tract;
- c) in macrophages of lymph nodes;
- d) in red blood cells;
- e) in all the mentioned variants.

**798. The genetic variability that provides the appearance of a pandemic strain of the influenza virus is...**

*Variants of answer:*

- a) transduction;
- b) gene insertion;
- c) gene shift;
- d) gene drift;
- e) complementation.

**799. Influenza virus strain with highest pathogenic potential is...**

*Variants of answer:*

- a) H1N1;
- b) H7N9;
- c) H5N1;
- d) H3N2;
- e) H2N2.

**800. Genetic shift of Influenzaviruses means...**

*Variants of answer:*

- a) genetic reassortment of hemagglutinin and neuraminidase genes;
- b) influenzavirus genes movement along the host cell chromosome;
- c) influenza gene transfer from swine to human hosts;
- d) point mutations within hemagglutinin and neuraminidase genes;
- e) genetic reassortment of influenzavirus gene encoding RNA polymerase.

**801. Express-method of influenza laboratory diagnosis is...**

*Variants of answer:*

- a) hemagglutination test;

- b) hemagglutination inhibition test;
- c) CFT;
- d) neutralization of chicken embryo death;
- e) immunofluorescent test.

**802. The reaction used for the serological diagnosis of influenza is...**

*Variants of answer:*

- a) hemolysis reaction;
- b) hemagglutination reaction;
- c) hemagglutination inhibition reaction;
- d) hemadsorption reaction;
- e) the phenomenon of interference.

**803. The genome of the Paramyxoviridae family is represented by...**

*Variants of answer:*

- a) 8 fragments of a negative-sense ssRNA;
- b) dsDNA with a single-stranded region;
- c) non-segmented negative-sense linear ssRNA;
- d) 8 fragments of a positive-sense ssRNA;
- e) non-segmented positive-sense linear ssRNA.

**804. Significant serological confirmation of Parainfluenza is...**

*Variants of answer:*

- a) formation of IgG only;
- b) formation of IgM and IgG;
- c) twofold rise of specific antibodies;
- d) fourfold rise of specific antibodies;
- e) fourfold decrease rise of specific antibodies.

**805. Morbillivirus can cause...**

*Variants of answer:*

- a) mumps;
- b) measles;
- c) acute bronchiolitis;
- d) pharyngoconjunctival fever;
- e) acute hemorrhagic cystitis.

**806. Measles virus...**

*Variants of answer:*

- a) requires disinfection;
- b) has one serovar;
- c) is pathogenic for animals and humans;
- d) is pathogenic only for children;
- e) is stable in the environment.

**807. Measles transmission mechanism is...**

*Variants of answer:*

- a) fecal-oral mechanism;
- b) transmissive mechanism;
- c) vertical mechanism;
- d) contact mechanism;
- e) aerogenic mechanism.

**808. Pathological material in measles is...**

*Variants of answer:*

- a) cerebrospinal fluid;
- b) feces;
- c) nasopharyngeal swabs;
- d) urine;
- e) sputum.

**809. Pathological material in the serological diagnosis of measles is...**

*Variants of answer:*

- a) cerebrospinal fluid;
- b) nasopharyngeal swabs;
- c) conjunctival discharge;
- d) paired sera;
- e) urine.

**810. Source of infection in measles is...**

*Variants of answer:*

- a) a sick person;
- b) virus carrier;
- c) birds;
- d) pets;
- e) food.

**811. The formation of symplasts in measles provides the presence of...**

*Variants of answer:*

- a) HN glycoprotein;
- b) M protein;
- c) neuraminidase;
- d) F protein;
- e) G protein.

**812. Rubella transmission mechanism is...**

*Variants of answer:*

- a) fecal-oral mechanism;

- b) transmissive mechanism;
- c) parenteral mechanism;
- d) contact mechanism;
- e) aerogenic mechanism.

**813. Rubella virus belongs to the family...**

*Variants of answer:*

- a) *Paramyxoviridae*;
- b) *Orthomyxoviridae*;
- c) *Togaviridae*;
- d) *Adenoviridae*;
- e) *Reoviridae*.

**814. Rubella virus...**

*Variants of answer:*

- a) is DNA-containing virus;
- b) is RNA-containing virus;
- c) is a simple virus;
- d) has a circular nucleic acid;
- e) has a spiral type of symmetry.

**815. A virus capable of causing congenital intrauterine infection is...**

*Variants of answer:*

- a) influenza virus;
- b) measles virus;
- c) mumps virus;
- d) rubella virus;
- e) hepatitis A virus.

**816. Most serious rubella complication is...**

*Variants of answer:*

- a) arthritis development;
- b) congenital rubella syndrome;
- c) lymphadenopathy;
- d) aseptic meningitis;
- e) secondary immunodeficiency.

**817. Vaccine for rubella prophylaxis is...**

*Variants of answer:*

- a) attenuated live vaccine;
- b) inactivated vaccine;
- c) subvirion vaccine with adjuvant;
- d) DNA vaccine;
- e) recombinant vaccine.

**818. A distinctive feature of the rubella virus is...**

*Variants of answer:*

- a) antigenic heterogeneity;
- b) high variability;
- c) inability to reproduce independently;
- d) teratogenicity;
- e) oncogenicity.

**819. Rubulavirus can cause...**

*Variants of answer:*

- a) epidemic keratoconjunctivitis;
- b) mumps;
- c) measles;
- d) pharyngoconjunctival fever;
- e) none of the mentioned variants.

**820. Characteristics for mumps are all the listed below variants except...**

*Variants of answer:*

- a) anthroponosis;
- b) zooanthroponosis;
- c) may cause orchitis in boys;
- d) it affects mainly children aged 5–10 years;
- e) it is the least sensitive to children at the age of the first 6 months.

**821. The main route of mumps transmission is...**

*Variants of answer:*

- a) air-dust route;
- b) airborne route;
- c) contact route;
- d) transplacental route;
- e) alimentary route.

**822. Vaccine for mumps prophylaxis is...**

*Variants of answer:*

- a) inactivated vaccine;
- b) attenuated live vaccine;
- c) subvirion vaccine;
- d) subunit vaccine;
- e) recombinant vaccine.

**823. Structural properties of Paramyxoviruses are...**

*Variants of answer:*

- a) helical symmetry, spherical shape;

- b) icosahedral symmetry, rod-shaped form;
- c) naked virus, rod-shaped form;
- d) enveloped virus, icosahedral symmetry;
- e) complex symmetry, spherical shape.

**824. Parainfluenza virus cell entry is facilitated by...**

*Variants of answer:*

- a) G protein;
- b) M protein;
- c) HN glycoprotein;
- d) neuraminidase;
- e) F protein.

**825. A representative of Paramyxoviridae capable of affecting the reproductive system is...**

*Variants of answer:*

- a) parainfluenza virus;
- b) morbillivirus;
- c) respiratory syncytial virus;
- d) mumps virus;
- e) all the mentioned variants.

**826. Test for respiratory syncytial virus identification is...**

*Variants of answer:*

- a) hemagglutination inhibition test;
- b) cytopathic effect neutralization;
- c) hemadsorption inhibition test;
- d) hemadsorption test;
- e) plaque formation.

**827. Paired sera test is considered to be significant in case of antibodies titer rise...**

*Variants of answer:*

- a) twofold;
- b) fourfold and more;
- c) eightfold and more;
- d) tenfold and more;
- e). fourfold and less.

**828. Trivalent vaccine for respiratory disease prophylaxis is composed of...**

*Variants of answer:*

- a) live parainfluenza virus, mumps virus, measles virus;
- b) live influenza virus, mumps virus, measles virus;

- c) inactivated influenza virus, live mumps virus, measles virus;
- d) live rubella virus, influenza virus, measles virus;
- e) live rubella virus, mumps virus, measles virus.

**829. Most suitable vaccine for respiratory syncytial virus infection prophylaxis is...**

*Variants of answer:*

- a) inactivated vaccine;
- b) attenuated live vaccine;
- c) subvirion vaccine;
- d) subunit vaccine;
- e) none of the mentioned variants.

**830. Paramyxoviridae representative which are lack of hemagglutinin activity is...**

*Variants of answer:*

- a) parainfluenza virus;
- b) rubulavirus;
- c) morbillivirus;
- d) mumps virus;
- e) respiratory syncytial virus.

**831. Test for Parainfluenza virus identification is...**

*Variants of answer:*

- a) hemadsorption inhibition test;
- b) hemagglutination test;
- c) hemadsorption test;
- d) inclusion formation;
- e) cytopathic effect detection.

**832. Viral disease successfully managed by specific prophylaxis is...**

*Variants of answer:*

- a) adenoviral infection;
- b) measles;
- c) parainfluenza;
- d) coronaviral infection;
- e) respiratory syncytial infection.

**833. Most efficient method for SARS virus laboratory diagnosis is...**

*Variants of answer:*

- a) cell culture;
- b) hemagglutination inhibition test;

- c) infection of laboratory animals;
- d) PCR;
- e) cytopathic effect neutralization.

**834. Structural characteristics of Coronaviridae family are...**

*Variants of answer:*

- a) positive-sense ssRNA, helical capsid;
- b) negative-sense ssRNA, helical capsid;
- c) dsDNA, helical capsid;
- d) ssDNA, cubic capsid;
- e) with a single-stranded unfinished fragment.

**835. What membrane receptor the coronavirus have affinity for?**

*Variants of answer:*

- a) CD4;
- b) cell-surface sialic acid;
- c) angiotensin-converting enzyme 2;
- d) intercellular adhesion molecule 1;
- e) CD21.

**836. Method used to detect coronavirus nucleic acid is...**

*Variants of answer:*

- a) ELISA;
- b) PCR;
- c) IFA;
- d) RIHA;
- e) RA.

**837. Structural properties of Picornaviridae are...**

*Variants of answer:*

- a) ssDNA naked viruses;
- b) dsDNA enveloped viruses;
- c) positive-sense RNA naked viruses;
- d) negative-sense RNA enveloped viruses;
- e) positive-sense RNA enveloped viruses.

**838. The Picornaviridae family includes the following viruses except...**

*Variants of answer:*

- a) poliomyelitis virus;
- b) ECHO viruses;
- c) Coxsackie A viruses;
- d) Coxsackie B viruses;
- e) Epstein – Barr virus.

**839. Enteroviruses include ...**

*Variants of answer:*

- a) yellow fever viruses;
- b) ECHO viruses;
- c) cytomegaloviruses;
- d) hepatitis B viruses;
- e) Varicella Zoster virus.

**840. The following viruses of the Picornaviridae family have the largest number of serotypes...**

*Variants of answer:*

- a) polioviruses;
- b) ECHO viruses;
- c) rhinoviruses;
- d) Coxsackie viruses;
- e) hepatitis A virus.

**841. Structural property of Rotaviruses is...**

*Variants of answer:*

- a) dsDNA naked virus;
- b) diploid positive RNA enveloped virus;
- c) ambisense segmented ssRNA enveloped virus;
- d) dsRNA-segmented naked virus with 2 capsids;
- e) positive-sense RNA naked virus.

**842. Representative of picornaviruses causing foot-and-mouth disease is...**

*Variants of answer:*

- a) enterovirus;
- b) parechovirus;
- c) rhinovirus;
- d) cardiovirus;
- e) aphthovirus.

**843. Most resistant virus from the listed below is...**

*Variants of answer:*

- a) measles virus;
- b) poliovirus;
- c) influenza virus;
- d) parainfluenza virus;
- e) mumps virus.

**844. Picornaviral infection successfully controlled by specific prophylaxis is...**

*Variants of answer:*

- a) poliomyelitis;

- b) Coxsackie infection;
- c) echoviral infection;
- d) rhinoviral infection;
- e) none of the mentioned variants.

**845. All the listed below methods are used for Coxsackie infection diagnosis except...**

*Variants of answer:*

- a) inoculation of virus-containing material into tissue cultures;
- b) inoculation of virus-containing material into suckling mice;
- c) ELISA;
- d) inoculation of virus-containing material into cell-free medium;
- e) hemagglutination inhibition test.

**846. Polyomavirus has...**

*Variants of answer:*

- a) 4 serotypes;
- b) 3 serotypes;
- c) 7 serotypes;
- d) 5 serotypes;
- e) 6 serotypes.

**847. Most common form of poliomyelitis is...**

*Variants of answer:*

- a) abortive poliomyelitis;
- b) non-paralytic poliomyelitis;
- c) aseptic meningitis;
- d) paralytic poliomyelitis;
- e) herpangina.

**848. Method not used for poliomyelitis laboratory diagnosis is...**

*Variants of answer:*

- a) hemagglutination test;
- b) cell line cultivation;
- c) cytopathic effect determination;
- d) serologic testing;
- e) neutralization reaction.

**849. The primary reproduction of enteroviruses in the body occurs in...**

*Variants of answer:*

- a) tissue macrophages;
- b) spinal cord neurons;

- c) epithelium of the small intestine;
- d) blood;
- e) lymph nodes.

**850. A feature of Coxsackie and ECHO viruses determining the pathogenesis of caused diseases is...**

*Variants of answer:*

- a) polytropism;
- b) organotropism;
- c) hemagglutinating activity;
- d) oncogenicity;
- e) formation of immunological tolerance.

**851. Coxsackie and ECHO viruses are similar in...**

*Variants of answer:*

- a) virion structure;
- b) the ability to grow on nutrient media;
- c) antigenic structure;
- d) virulence for laboratory animals;
- e) *in vitro* culture method.

**852. Coxsackie and ECHO viruses don't cause...**

*Variants of answer:*

- a) serous meningitis;
- b) poliomyelitis;
- c) encephalitis;
- d) neonatal myocarditis;
- e) conjunctivitis.

**853. Specific prevention of infections caused by Coxsackie and ECHO viruses is...**

*Variants of answer:*

- a) live polio vaccine;
- b) polio killed vaccine;
- c) Ig;
- d) bacteriophages;
- e) none of the mentioned variants because vaccine remains unavailable yet.

**854. Viral agent that predominantly affect inner organs is...**

*Variants of answer:*

- a) rotaviruses;
- b) polioviruses;

- c) Coxsackie viruses of group A;
- d) Coxsackie viruses of group B;
- e) echoviruses.

**855. All the listed below diseases are caused by Coxsackie virus except...**

*Variants of answer:*

- a) epidemic myalgia;
- b) aseptic meningitis;
- c) pharyngoconjunctival fever;
- d) herpangina;
- e) myocarditis.

**856. Polio oral vaccine is used for...**

*Variants of answer:*

- a) emergency specific prophylaxis;
- b) advance specific prophylaxis;
- c) advance non-specific prophylaxis;
- d) treatment;
- e) emergency specific prophylaxis and treatment.

**857. Post-infectious immunity in case of poliomyelitis is...**

*Variants of answer:*

- a) strong and long-lasting;
- b) from 6 months to 2 years;
- c) persists for a year after illness;
- d) persists for a month after illness;
- e) from 3 months to 3 years.

**858. The main mechanism of transmission of poliomyelitis is...**

*Variants of answer:*

- a) fecal-oral mechanism;
- b) aerogenic mechanism;
- c) transmissive mechanism;
- d) contact mechanism;
- e) vertical mechanism.

**859. Main cellular targets for polioviruses are...**

*Variants of answer:*

- a) striated muscular cells;
- b) epithelial cells;
- c) glial cells;
- d) spinal cord motoneurons;
- e) axons of peripheral nerves.

**860. Antibodies of IgG and IgA classes against polioviruses are present in most of human population because of...**

*Variants of answer:*

- a) broad spread of sub-clinical infection;
- b) viral latency (intestinal viral carriage);
- c) viral persistence within immune system;
- d) previous immunization with live vaccine;
- e) previous immunization with inactivated vaccine.

**861. Candidate for global elimination in nearest future is...**

*Variants of answer:*

- a) Hepatovirus;
- b) Enterovirus 70;
- c) Adenovirus 21;
- d) Rotavirus;
- e) Poliovirus.

**862. Clinical specimen for poliovirus detection should be taken from...**

*Variants of answer:*

- a) rectal swab or stool specimen;
- b) urine;
- c) nasopharyngeal swab;
- d) nasopharyngeal swab and stool specimen;
- e) blood.

**863. The most severe adenoviral infection of early postnatal period is...**

*Variants of answer:*

- a) adenoviral gastroenteritis;
- b) adenoviral pneumonia;
- c) acute hemorrhagic cystitis;
- d) acute febrile pharyngitis;
- e) epidemic keratoconjunctivitis.

**864. Structural properties of Adenoviridae...**

*Variants of answer:*

- a) dsDNA naked virus;
- b) dsDNA enveloped virus;
- c) positive-sense RNA naked virus;
- d) negative-sense RNA enveloped virus;
- e) positive-sense RNA enveloped virus.

**865. The major causative agent of infant's gastroenteritis is...**

*Variants of answer:*

- a) Enterovirus 68–71;

- b) Rhinovirus;
- c) Parechovirus;
- d) Coxsackie viruses;
- e) Rotavirus.

**866. Rotaviruses pertain to...**

*Variants of answer:*

- a) enteroviruses;
- b) reoviruses;
- c) rhinoviruses;
- d) echoviruses;
- e) parechoviruses.

**867. Research material for the diagnosis of rotavirus infection is...**

*Variants of answer:*

- a) urine;
- b) cerebrospinal fluid;
- c) nasopharyngeal swabs;
- d) feces;
- e) sputum.

**868. A virus with nonstructural protein with enterotoxin function is...**

*Variants of answer:*

- a) enterovirus;
- b) adenovirus;
- c) rotavirus;
- d) echoviruses;
- e) hepatitis A virus.

**869. Basic treatment of rotaviral infection is...**

*Variants of answer:*

- a) restoring of water and electrolyte balance with compensatory infusion therapy;
- b) administration of antiviral drugs;
- c) antibiotic treatment;
- d) intravenous Ig administration;
- e) urgent vaccination.

**870. Swimming pool conjunctivitis is caused by...**

*Variants of answer:*

- a) Coxsackie virus group A;
- b) Coxsackie virus group B;

- c) adenovirus;
- d) rotavirus;
- e) rhinovirus.

**871. Human adenoviruses are characterized by the following properties:**

*Variants of answer:*

- a) serological (antigenic) diversity;
- b) universal capacity for persistence;
- c) universal oncogenicity (for animals);
- d) tendency to shift mutations;
- e) tendency to drift mutations.

**872. Infection caused by arbovirus is...**

*Variants of answer:*

- a) poliomyelitis;
- b) rubella;
- c) yellow fever;
- d) smallpox;
- e) chicken pox.

**873. Arbovirus infections are characterized by...**

*Variants of answer:*

- a) fecal-oral mechanism of transmission;
- b) anthroponotic infections;
- c) the ability of pathogens to overcome the blood-brain barrier;
- d) a wide range of carriers in natural foci;
- e) cyclical infections.

**874. Arboviruses belong to the families...**

*Variants of answer:*

- a) *Togaviridae, Bunyaviridae;*
- b) *Hepadnaviridae, Picornaviridae;*
- c) *Orthomyxoviridae, Adenoviridae;*
- d) *Paramyxoviridae, Papillomaviridae;*
- e) all the mentioned variants.

**875. The following virus does not belong to the arbovirus group:**

*Variants of answer:*

- a) tick-borne encephalitis virus;
- b) Chikungunya fever virus;
- c) Japanese encephalitis virus;
- d) rubella virus;
- e) Omsk hemorrhagic fever virus.

**876. Clinical forms of diseases caused by arboviruses are...**

*Variants of answer:*

- a) rhinitis, sinusitis, pharyngitis;
- b) spongiform encephalopathy;
- c) hepatitis and enterocolitis;
- d) purulent-septic infections;
- e) hemorrhagic fevers or encephalitis.

**877. Arboviruses are characterized by...**

*Variants of answer:*

- a) the ecological group of viruses;
- b) viruses are isolated by infecting suckling mice;
- c) the ability to form specific inclusions in the neurons of the brain;
- d) appearance of asymptomatic virus carriers;
- e) a single taxonomic group.

**878. Alphaviruses belong to the family...**

*Variants of answer:*

- a) *Flaviviridae*;
- b) *Retroviridae*;
- c) *Togaviridae*;
- d) *Bunyaviridae*;
- e) *Astroviridae*.

**879. Ebola virus belongs to the family...**

*Variants of answer:*

- a) *Flaviviridae*;
- b) *Filoviridae*;
- c) *Togaviridae*;
- d) *Bunyaviridae*;
- e) *Astroviridae*.

**880. Tick-borne encephalitis virus belongs to the family...**

*Variants of answer:*

- a) *Flaviviridae*;
- b) *Retroviridae*;
- c) *Togaviridae*;
- d) *Bunyaviridae*;
- e) *Astroviridae*.

**881. The test material for tick-borne encephalitis can be anything except...**

*Variants of answer:*

- a) blood;

- b) sputum;
- c) liquor;
- d) urine;
- e) sectional material.

**882. Carriers of tick-borne encephalitis are...**

*Variants of answer:*

- a) fleas;
- b) mosquitoes;
- c) lice;
- d) flies;
- e) ixodid ticks.

**883. Test material for virological diagnosis of tick-borne encephalitis is...**

*Variants of answer:*

- a) nasopharyngeal fluid;
- b) saliva;
- c) punctate of lymph nodes;
- d) liquor;
- e) feces.

**884. The causative agent of yellow fever and Dengue fever belong to the family...**

*Variants of answer:*

- a) *Togaviridae*;
- b) *Filoviridae*;
- c) *Flaviviridae*;
- d) *Adenoviridae*;
- e) *Bunyaviridae*.

**885. Diseases caused by Arenaviruses are...**

*Variants of answer:*

- a) yellow fever and Dengue fever;
- b) Karelian fever and Chikungunya hemorrhagic fever;
- c) Lassa fever and Argentine hemorrhagic fever;
- d) hemorrhagic fever with renal syndrome and mosquito fevers;
- e) Eastern and Western equine encephalomyelitis.

**886. Diseases caused by Bunyaviruses are...**

*Variants of answer:*

- a) yellow fever and dengue fever;
- b) Karelian fever and Chikungunya hemorrhagic fever;
- c) Lassa fever and Argentine hemorrhagic fever;

- d) hemorrhagic fever with renal syndrome and mosquito fevers;
- e) Eastern and Western equine encephalomyelitis.

**887. *Togaviruses do not cause...***

*Variants of answer:*

- a) Karelian fever;
- b) Chikungunya fever;
- c) Eastern equine encephalomyelitis;
- d) Western equine encephalomyelitis;
- e) Bolivian hemorrhagic fever.

**888. *Structural properties of Lyssavirus are...***

*Variants of answer:*

- a) negative-sense RNA enveloped virus;
- b) positive-sense RNA naked virus;
- c) diploid RNA enveloped virus;
- d) positive-sense RNA enveloped virus;
- e) dsDNA enveloped virus.

**889. *Main route of transmission in rabies is...***

*Variants of answer:*

- a) alimentary route;
- b) transmissive route;
- c) contact route;
- d) airborne route;
- e) transplacental route.

**890. *The source of infection in rabies is all of the following with the exception of...***

*Variants of answer:*

- a) dogs;
- b) cats;
- c) foxes;
- d) wolves;
- e) a sick person.

**891. *The pathogenesis of rabies is characterized by...***

*Variants of answer:*

- a) prolonged viremia;
- b) the formation of severe immunodeficiency;
- c) irreversible degeneration of CNS neurons;
- d) damage by immune complexes;
- e) virogeny.

**892. Post-infectious immunity in rabies is...**

*Variants of answer:*

- a) non-lasting immunity;
- b) long-lasting immunity;
- c) 100 % mortality;
- d) lifelong immunity;
- e) non-sterile immunity.

**893. Inclusions in lyssavirus-infected cells are...**

*Variants of answer:*

- a) elementary bodies;
- b) reticulate bodies;
- c) Guarnieri bodies;
- d) Babes – Negri bodies;
- e) Paschen's bodies.

**894. Babes – Negri bodies can be found in ...**

*Variants of answer:*

- a) hepatocytes;
- b) neurons of brain or spinal cord;
- c) epithelium cells of the respiratory tract;
- d) kidneys cells;
- e) blood cells.

**895. Rabies virus has a tropism to...**

*Variants of answer:*

- a) intestinal epithelium;
- b) nervous tissue only;
- c) nervous tissue and salivary gland tissue;
- d) respiratory tract epithelium;
- e) blood cells.

**896. The rabies virus is not characterized by...**

*Variants of answer:*

- a) the presence of a supercapsid;
- b) viremia;
- c) intraaxonal transport;
- d) neurotropism;
- e) asymptomatic reservoir among wild animals.

**897. Mortality rate in manifested rabies is...**

*Variants of answer:*

- a) less than 20 %;

- b) 20–50 %;
- c) 50–70 %;
- d) 100 %;
- e) less than 20 % if treated.

**898. From the primary lesion, the rabies virus spreads...**

*Variants of answer:*

- a) by blood;
- b) by lymph;
- c) within immune cells;
- d) via peripheral nerves;
- e) all the mentioned variants.

**899. Animals in which the rabies virus remains viable for a long time are...**

*Variants of answer:*

- a) ferrets;
- b) raccoons;
- c) foxes;
- d) vampire bats;
- e) dogs.

**900. The scientist who created the first vaccine to prevent rabies is...**

*Variants of answer:*

- a) R. Koch;
- b) V. Babes;
- c) A. Negri;
- d) L. Pasteur;
- e) J. Meister.

**901. The anti-rabies culture vaccine contains...**

*Variants of answer:*

- a) inactivated poliomyelitis viruses;
- b) inactivated lyssavirus;
- c) attenuated strains of poliomyelitis viruses;
- d) attenuated strains of lyssavirus;
- e) antibodies against lyssavirus.

**902. Rabies treatment in case of animal multiple bites into head and upper limbs is...**

*Variants of answer:*

- a) specific vaccination;
- b) anti-rabies Ig treatment;

- c) anti-rabies Ig treatment combined with vaccination;
- d) specific vaccination combined with IFN treatment;
- e) anti-rabies Ig administration combined with antibiotic treatment.

**903. HIV belongs to the family...**

*Variants of answer:*

- a) *Picornaviridae*;
- b) *Paramixoviridae*;
- c) *Herpesviridae*;
- d) *Retroviridae*;
- e) *Orthomixoviridae*.

**904. The surface antigens of HIV are...**

*Variants of answer:*

- a) p17;
- b) gp41;
- c) p24;
- d) p18;
- e) p26.

**905. Virion enzyme that triggers HIV infection is...**

*Variants of answer:*

- a) reverse transcriptase;
- b) RNase;
- c) integrase;
- d) protease;
- e) RNA-dependent RNA polymerase.

**906. Virion enzyme that terminates HIV replication is...**

*Variants of answer:*

- a) reverse transcriptase;
- b) RNase;
- c) integrase;
- d) protease;
- e) RNA-dependent RNA polymerase.

**907. HIV capsid antigen is...**

*Variants of answer:*

- a) p17;
- b) gp41;
- c) p24;
- d) p18;
- e) p26.

**908. HIV is...**

*Variants of answer:*

- a) a simple virus;
- b) acquired immunodeficiency virus;
- c) DNA genomic virus;
- d) polypathogenic virus;
- e) intestinal virus;

**909. Acquired immunodeficiency syndrome indicator disease is...**

*Variants of answer:*

- a) skin rash;
- b) pneumocystis pneumonia;
- c) rotavirus gastroenteritis;
- d) adenovirus conjunctivitis;
- e) coronavirus rhinitis.

**910. Viral load in HIV infection is determined to...**

*Variants of answer:*

- a) clarify of the etiological diagnosis;
- b) determine the effectiveness of antiretroviral therapy;
- c) assess of the immune status;
- d) identify infected people in risk groups;
- e) determine the number of T lymphocytes.

**911. Method for determining the viral load of HIV infection is...**

*Variants of answer:*

- a) immunoblotting;
- b) PCR;
- c) ELISA;
- d) immune electron microscopy (IEM);
- e) IFA.

**912. The method confirming a positive diagnosis of HIV infection is...**

*Variants of answer:*

- a) IFA;
- b) PCR;
- c) immunoblotting;
- d) IEM;
- e) RIA.

**913. Specific HIV prevention ...**

*Variants of answer:*

- a) is carried out using a live vaccine;
- b) is carried out using immune serum;

- c) has not been developed;
- d) is based on the identification and isolation of patients;
- e) is carried out using a killed vaccine.

**914. Primary laboratory test for serological diagnosis of HIV infection is...**

*Variants of answer:*

- a) latex agglutination;
- b) reverse transcriptase PCR (RT-PCR);
- c) immunoblotting;
- d) RIA;
- e) ELISA.

**915. Highly active antiretroviral therapy includes...**

*Variants of answer:*

- a) treatment with reverse transcriptase inhibitors;
- b) combination of reverse transcriptase inhibitors and viral integrase inhibitors;
- c) combination of reverse transcriptase inhibitors and immunostimulatory drugs;
- d) combination of reverse transcriptase inhibitors and viral protease inhibitors;
- e) combination of nucleoside and non-nucleoside reverse transcriptase inhibitors.

**916. Cytokine-stimulating HIV replication is...**

*Variants of answer:*

- a) IL-2;
- b) IL-4;
- c) IL-8;
- d) beta-IFN;
- e) TNF-alpha.

**917. Confirmatory test for HIV infection diagnosis is...**

*Variants of answer:*

- a) southern blotting;
- b) northern blotting;
- c) western blotting;
- d) eastern blotting;
- e) RT-PCR.

**918. Successful penetration of HIV into susceptible cell is achieved via...**

*Variants of answer:*

- a) cellular CD1 antigen;
- b) cellular adrenoreceptors associated with G proteins;
- c) cellular CD8 antigen and TNF receptor;
- d) cellular CD4 antigen and CXCR4 or CCR5;
- e) cellular CD4 antigen and GM-CSF receptor.

**919. HIV infection is transmitted by all the transmission routes listed below, with the exception of...**

*Variants of answer:*

- a) intravenous drug use;
- b) vertical route;
- c) the infected saliva of the patient;
- d) sexual contact;
- e) parenteral route.

**920. First clinical manifestation in HIV infection is...**

*Variants of answer:*

- a) persistent generalized lymphadenopathy;
- b) acute mononucleosis-like syndrome;
- c) cytomegalovirus infection;
- d) Varicella zoster virus infections;
- e) mycobacterial infections.

**921. Critical blood level of T helper cells resulting in AIDS development is...**

*Variants of answer:*

- a) 1000–1500 T-helper cells per 1 microliter ( $\mu\text{l}$ );
- b) less than 1000 cells but more than 500 cells per 1  $\mu\text{l}$ ;
- c) 200–500 T-helper cells per 1  $\mu\text{l}$ ;
- d) less than 200 cells per 1  $\mu\text{l}$ ;
- e) less than 100 cells per 1  $\mu\text{l}$ .

**922. Immune cells that store and disseminate HIV are...**

*Variants of answer:*

- a) T-helper CD4(+) cells;
- b) B cells;
- c) neutrophils;
- d) macrophages and monocytes;
- e) cytotoxic CD8(+) T cells.

**923. The scientist who first described HIV is...**

*Variants of answer:*

- a) L. Pasteur;
- b) D. I. Ivanovsky;
- c) L. Montagnier;
- d) F. D'Errel;
- e) N. F. Gamaleya.

**924. Hepatitis which can be transmitted artificially are...**

*Variants of answer:*

- a) hepatitis C, hepatitis B;
- b) hepatitis C, hepatitis B, hepatitis E;
- c) hepatitis A, hepatitis E;
- d) hepatitis A, hepatitis B, hepatitis D;
- e) hepatitis C, hepatitis D, hepatitis B.

**925. The disease with highest rate of transmission to susceptible persons after medical manipulations is...**

*Variants of answer:*

- a) HIV infection;
- b) hepatitis A;
- c) hepatitis B;
- d) hepatitis delta virus (HDV) infection;
- e) hepatitis C and HIV mixed infection.

**926. Hepatitis with the longest incubation period is...**

*Variants of answer:*

- a) hepatitis A;
- b) hepatitis B;
- c) hepatitis C;
- d) hepatitis D;
- e) hepatitis E.

**927. Causative agent that induces the most severe fulminant hepatitis is...**

*Variants of answer:*

- a) delta virus;
- b) hepatovirus;
- c) hepadnavirus;
- d) hepacivirus;
- e) hepevirus.

**928. Hepatitis virus which is able to integrate its DNA into hepatic cell genome is...**

*Variants of answer:*

- a) hepatovirus;
- b) hepadnavirus;
- c) delta virus;
- d) hepacivirus;
- e) hepevirus.

**929. Serological marker of Hepatitis B virus active replication is...**

*Variants of answer:*

- a) Hepatitis B surface antigen;
- b) Hepatitis B core antigen;
- c) Hepatitis B e antibody;
- d) Hepatitis B e antigen;
- e) Hepatitis B surface antibody.

**930. Vaccine for hepatitis B prophylaxis is...**

*Variants of answer:*

- a) recombinant vaccine;
- b) subvirion vaccine with adjuvant;
- c) subunit vaccine;
- d) inactivated vaccine;
- e) attenuated live vaccine.

**931. Hepatitis virus with the greatest genetic diversity is...**

*Variants of answer:*

- a) hepatitis A virus;
- b) hepatitis B virus;
- c) hepatitis C virus;
- d) hepatitis D virus;
- e) hepatitis E virus.

**932. Hepatitis C is characterized by...**

*Variants of answer:*

- a) long-term latent course;
- b) especially severe course in pregnant women;
- c) the absence of monoinfection;
- d) persistent post-infection immunity;
- e) fulminant type of infection only.

**933. Most successful method for hepatitis C treatment is...**

*Variants of answer:*

- a) administration of reverse transcriptase inhibitors;
- b) ribavirin treatment;
- c) recombinant IL-2 treatment;
- d) recombinant IFN-alpha treatment;
- e) velpatasvir and simeprevir treatment.

**934. Hepatitis C specific prevention is...**

*Variants of answer:*

- a) killed vaccine;

- b) recombinant vaccine;
- c) not developed;
- d) IFN;
- e) live vaccine.

**935. The serological marker of hepatitis D virus is not...**

*Variants of answer:*

- a) IgM anti-HDV;
- b) IgM anti-HDV;
- c) viral RNA;
- d) Hepatitis B surface antigen;
- e) total antibody to hepatitis D virus.

**936. Hepatitis D develops as a result of...**

*Variants of answer:*

- a) Hepatitis Delta monoinfection;
- b) simultaneous infection with Hepatitis G (co-infection);
- c) simultaneous infection with Hepatitis C (co-infection);
- d) infection with Hepatitis Delta in a patient with acute hepatitis B (superinfection);
- e) infection with Hepatitis Delta in a patient with chronic hepatitis B (superinfection).

**937. Hepatitis D prophylaxis is...**

*Variants of answer:*

- a) not developed;
- b) vaccination against hepatitis B;
- c) vaccination against hepatitis A;
- d) IFN;
- e) Ig.

**938. Serological marker of hepatitis G virus is...**

*Variants of answer:*

- a) RNA polymerase;
- b) viral RNA, anti-Hepatitis G IgM;
- c) viral DNA, anti-Hepatitis G IgM;
- d) anti-hepatitis C virus IgM;
- e) anti-hepatitis C virus IgG.

**939. Hepatitis transmitted predominantly by fecal-to-oral route are...**

*Variants of answer:*

- a) hepatitis A, hepatitis B;
- b) hepatitis A, hepatitis C, hepatitis B;

- c) hepatitis A, hepatitis B, hepatitis E;
- d) hepatitis A, hepatitis B, hepatitis D;
- e) hepatitis A, hepatitis E.

**940. Hepatitis caused by Picornaviridae representative is...**

*Variants of answer:*

- a) hepatitis A;
- b) hepatitis B;
- c) hepatitis C;
- d) hepatitis D;
- e) hepatitis E.

**941. Method of cultivation of hepatitis A virus in vitro is...**

*Variants of answer:*

- a) human fetal lung fibroblast cells;
- b) rabbits;
- c) newborn baby mice;
- d) not cultivated;
- e) liver broth.

**942. The hepatitis A virus marker is not...**

*Variants of answer:*

- a) bilirubin;
- b) anti-hepatitis A virus;
- c) IgM, IgG;
- d) hepatitis A virus antigen;
- e) RNA.

**943. Hepatitis A virus marker in clinically severe hepatitis is...**

*Variants of answer:*

- a) bilirubin;
- b) HA-Ag;
- c) IgM, IgG;
- d) RNA;
- e) aminotransferases.

**944. Efficient vaccine for hepatitis A prophylaxis is...**

*Variants of answer:*

- a) lack of vaccination;
- b) inactivated vaccine;
- c) attenuated live vaccine;
- d) recombinant vaccine;
- e) subunit peptide vaccine.

**945. Hepatic disease that does not have a of specific vaccination is...**

*Variants of answer:*

- a) hepatitis A;
- b) hepatitis B;
- c) hepatitis C;
- d) delta infection;
- e) co-infection with hepatitis B and delta viruses.

**946. Hepatitis E is most dangerous in...**

*Variants of answer:*

- a) infants;
- b) pregnant women;
- c) school-age children and teenagers;
- d) elderlies;
- e) men.

**947. The hepatitis E virus marker is not...**

*Variants of answer:*

- a) Hepatitis E Ag;
- b) autoantibodies;
- c) IgM;
- d) IgG;
- e) viral RNA.

**948. Most resistant causative agent of viral hepatitis is...**

*Variants of answer:*

- a) hepatovirus;
- b) delta virus;
- c) hepacivirus;
- d) hepadnavirus;
- e) hepevirus.

**949. Type 3 herpesvirus is...**

*Variants of answer:*

- a) simplex virus;
- b) Varicella-zoster herpesvirus;
- c) cytomegalovirus;
- d) Epstein – Barr virus;
- e) roseolovirus.

**950. The virus that causes a specific tumor in AIDS patients is...**

*Variants of answer:*

- a) herpesvirus of type 8;

- b) herpesvirus of type 6;
- c) herpesvirus of type 2;
- d) Epstein – Barr virus;
- e) cytomegalovirus.

**951. *Gammaherpesvirinae* representative is...**

*Variants of answer:*

- a) cytomegalovirus;
- b) Epstein – Barr virus;
- c) varicellovirus;
- d) herpes simplex virus;
- e) herpesvirus of type 6.

**952. *Betaherpesvirinae* representative is...**

*Variants of answer:*

- a) Epstein – Barr virus;
- b) varicellovirus;
- c) herpes simplex virus;
- d) herpesvirus of type 8;
- e) cytomegalovirus.

**953. *Herpes viruses* are characterized by ...**

*Variants of answer:*

- a) positive-sense RNA naked virus;
- b) negative-sense RNA enveloped virus;
- c) diploid RNA enveloped virus;
- d) positive-sense RNA enveloped virus;
- e) dsDNA enveloped virus.

**954. *Herpes zoster (shingles)* occurs in a person who has had...**

*Variants of answer:*

- a) herpes simplex;
- b) chicken pox;
- c) infectious mononucleosis;
- d) measles;
- e) mumps.

**955. *Drug for successful herpes simplex infection treatment* is...**

*Variants of answer:*

- a) indinavir;
- b) saquinavir;
- c) acyclovir;

- d) ribavirin;
- e) lamivudin.

**956. Roseoloviruses are characterized by ...**

*Variants of answer:*

- a) positive-sense RNA enveloped virus;
- b) negative-sense RNA enveloped virus;
- c) dsDNA enveloped virus;
- d) circular dsDNA enveloped virus;
- e) dsDNA naked virus.

**957. Herpesvirus transmitted predominantly by sexual intercourse is...**

*Variants of answer:*

- a) herpesvirus of type 1;
- b) herpesvirus of type 2;
- c) herpesvirus of type 3;
- d) herpesvirus of type 4;
- e) herpesvirus of type 5.

**958. The virus that cause congenital abnormalities is...**

*Variants of answer:*

- a) rhabdovirus;
- b) cytomegalovirus;
- c) varicellovirus;
- d) herpesvirus of type 8;
- e) Epstein – Barr virus.

**959. Viral entry of Epstein – Barr virus into B cells occurs via...**

*Variants of answer:*

- a) CD19;
- b) CD20;
- c) CD21;
- d) CD5;
- e) CD40.

**960. Predominant site of Herpesvirus type 2 persistency is...**

*Variants of answer:*

- a) urogenital epithelium;
- b) intestinal epithelium;
- c) lymph nodes;
- d) brain;
- e) sacral ganglia.

**961. A eventual causative agent of carcinogenesis is...**

*Variants of answer:*

- a) rubella virus;
- b) Epstein – Barr virus;
- c) herpes simplex virus;
- d) herpes zoster virus;
- e) lyssavirus.

**962. Herpesvirus type 8 can cause...**

*Variants of answer:*

- a) Burkitt's lymphoma;
- b) nasopharyngeal carcinoma;
- c) Kaposi's sarcoma;
- d) Hodgkin's disease;
- e) T-cell leukemia.

**963. Infectious agent in prion diseases is...**

*Variants of answer:*

- a) intracellular bacteriophage;
- b) DNA-containing virus;
- c) RNA-containing virus;
- d) abnormal protein;
- e) abnormal lipid.

**964. Molecular origin of prion diseases is...**

*Variants of answer:*

- a) overproduction of PrP<sup>C</sup> proteins;
- b) expression of PrP<sup>Sc</sup> proteins that spread their altered conformation towards normal PrP<sup>C</sup> proteins;
- c) enhanced expression of prion protein gene (PRNP);
- d) dampening of intracellular proteasome activity;
- e) self-aggregation of serum amyloid.

**965. Prion diseases affect...**

*Variants of answer:*

- a) cardiovascular system;
- b) CNS;
- c) lymphoid tissue;
- d) connective tissue;
- e) parenchymatous organs.

**966. Prion diseases are characterized by...**

*Variants of answer:*

- a) spongiform degeneration and atrophy, amyloid plaques;
- b) multifocal sclerosis;
- c) vasculitis and microhemorrhages;
- d) systemic inflammation;
- e) tissue edema.

**967. Acquired form of prion disease is...**

*Variants of answer:*

- a) Gerstmann – Straussler – Scheinker syndrome;
- b) sporadic form of Creutzfeldt – Jakob disease;
- c) a new phenotype of Creutzfeldt – Jakob disease;
- d) fatal familial insomnia;
- e) Alpers' syndrome.

**968. Kuru disease occurs as a result of ...**

*Variants of answer:*

- a) aerogenic transmission mechanism;
- b) water-borne mode route;
- c) insect bites;
- d) the contact transmission mechanism;
- e) ritual cannibalism.

**969. Prion disease characterized by sleeplessness mental disorders and endocrine dysfunction is...**

*Variants of answer:*

- a) Kuru disease;
- b) sporadic form of Creutzfeldt – Jakob disease;
- c) a new phenotype of Creutzfeldt – Jakob disease;
- d) fatal familial insomnia;
- e) Gerstmann – Straussler – Scheinker syndrome.

**970. Human prion disease transmitted by alimentary route with infected beef is...**

*Variants of answer:*

- a) fatal familial insomnia;
- b) Gerstmann – Straussler – Scheinker syndrome;
- c) Kuru disease;
- d) Alpers' syndrome;
- e) a new phenotype of Creutzfeldt – Jakob disease.

**971. The ailment with suspected prion origin is...**

*Variants of answer:*

- a) schizophrenia;
- b) sub-acute sclerosing panencephalitis;
- c) senile dementia;
- d) Alzheimer's disease;
- e) chronic fatigue syndrome.

**972. Diagnosis of prion diseases is based on...**

*Variants of answer:*

- a) PCR;
- b) molecular hybridization;
- c) cytological examination of brain tissue on autopsy;
- d) cell culture testing;
- e) neutralization test.

**973. Treatment of prion diseases is performed with...**

*Variants of answer:*

- a) proteases;
- b) anti-toxic antibodies;
- c) antibiotic drugs;
- d) anti-viral drugs;
- e) none of the mentioned variants; anti-prion drugs have not yet been developed.

**974. All the listed below measures are used for prevention of acquired prion diseases except...**

*Variants of answer:*

- a) vaccination;
- b) careful selection of donor's tissues for transplantation;
- c) strict control of medical sterilization;
- d) burning of dead animals;
- e) careful veterinary surveillance.

**975. Opportunistic microorganisms include...**

*Variants of answer:*

- a) *Rickettsia prowazekii*;
- b) *Klebsiella pneumoniae*;
- c) *Vibrio cholera*;
- d) *Clostridium tetani*;
- e) *Borrelia recurrentis*.

**976. Opportunistic infections are...**

*Variants of answer:*

- a) caused by fungi;
- b) nosocomial infections;
- c) caused by protozoa;
- d) caused by opportunistic microorganisms;
- e) caused by viruses.

**977. Clinical features of opportunistic infections are...**

*Variants of answer:*

- a) polysylogology;
- b) polyetiology;
- c) opportunistic infections often occur as mixed;
- d) opportunistic infections are often generalized;
- e) all the mentioned variants.

**978. Bacteremia is...**

*Variants of answer:*

- a) the presence of viable bacteria in blood;
- b) the presence of viable bacteria in liquor;
- c) the presence of viable bacteria in urea;
- d) acute generalized infection;
- e) chronic generalized infection.

**979. The most common causative agent of bloodstream infections is...**

*Variants of answer:*

- a) *Escherichia coli*;
- b) *Staphylococcus saprophyticus*;
- c) *Klebsiella pneumoniae*;
- d) *Pseudomonas aeruginosa*;
- e) *Enterococcus faecalis*.

**980. Nutrient media for primary blood cultures are...**

*Variants of answer:*

- a) biphasic medium, thioglycollate medium, Kitt – Tarozzi medium, Sabouraud medium;
- b) Endo's agar, Wilson – Blair agar, McConkey agar;
- c) Sabouraud agar, MPA, MPB;
- d) yolk-salt agar, Wilson – Blair agar, McConkey agar;
- e) Endo's agar, blood agar, Mueller – Hinton agar (MHA).

**981. The automatic analyzer for hemocultivations is...**

*Variants of answer:*

- a) VITEK;

- b) Ion Torrent;
- c) BacT/ALERT;
- d) PHOENIX;
- e) ATB expression system.

**982. Benefit(s) of automatic microbial growth detection is (are) ...**

*Variants of answer:*

- a) objectivity of results;
- b) high sensitivity of the method;
- c) quick positive result;
- d) accuracy;
- e) all the mentioned variants.

**983. The most common causative agents of purulent-septic infections are ...**

*Variants of answer:*

- a) *Klebsiella pneumoniae*, *Pseudomonas mirabilis*;
- b) *Pseudomonas aeruginosa*, *Acinetobacter baumannii*;
- c) *Staphylococcus aureus*, *Streptococcus pyogenes*;
- d) *Bacillus spp*;
- e) *Mycobacterium spp*.

**984. Primary pyoderma is ...**

*Variants of answer:*

- a) polymicrobial cellulitis;
- b) diabetic foot ulcer;
- c) postoperative wound infection;
- d) folliculitis;
- e) bedsores.

**985. It does not belong to secondary pyoderma:**

*Variants of answer:*

- a) post-traumatic infections;
- b) diabetic foot ulcer;
- c) postoperative wound infection;
- d) folliculitis;
- e) bedsores.

**986. Necrotizing infection is ...**

*Variants of answer:*

- a) polymicrobial cellulitis;
- b) diabetic foot ulcer;
- c) postoperative wound infection;
- d) folliculitis;
- e) bedsores.

**987. Basic culture media for diagnosing wound infections are...**

*Variants of answer:*

- a) blood agar, sugar broth, fluid thioglycollate medium;
- b) Sabouraud agar, MPA, MPB;
- c) thioglycollate medium, Kitt – Tarozzi medium, Zeissler's sugar-blood agar;
- d) Endo's agar, Wilson – Blair agar, McConkey agar;
- e) MPA, MPB, serum agar.

**988. Bacteriological investigation for sinusitis and bronchitis is...**

*Variants of answer:*

- a) hemocultivation;
- b) sputum investigation;
- c) examination of nasopharyngeal flushes;
- d) group A streptococcus test;
- e) not being carried out.

**989. Research material in upper respiratory tract infections (RTIs) is...**

*Variants of answer:*

- a) blood;
- b) sputum;
- c) nasopharyngeal swab;
- d) bronchial flushes;
- e) brush biopsy.

**990. Research material in lower RTIs respiratory tract infections is...**

*Variants of answer:*

- a) nasopharyngeal swab;
- b) feces;
- c) urea;
- d) sputum;
- e) liquor.

**991. Most common Gram-positive pathogens in urinary tract infections are...**

*Variants of answer:*

- a) *Klebsiella spp.*;
- b) *Streptococcus spp.*;
- c) *Staphylococcus spp.*;
- d) *Enterobacter spp.*;
- e) *Enterococcus spp.*

**992. The main method of microbiological diagnosis in urinary tract infections is...**

*Variants of answer:*

- a) express diagnostics;

- b) molecular-genetic method;
- c) serological method;
- d) microscopical method;
- e) bacteriological method.

**993. The main nutrient media for determining the bacteriuria degree are ...**

*Variants of answer:*

- a) MPB, fluid thioglycollate medium, Kligler's agar;
- b) serum broth, MHA, Kitt – Tarozzi medium;
- c) Endo's agar, blood agar, yolk-salt agar;
- d) biphasic medium, blood agar, yolk-salt agar;
- e) yolk-salt agar, Wilson – Blair agar, MacConkey agar.

**994. The bacterium most commonly causes ascending urinary tract infections is ...**

*Variants of answer:*

- a) *Proteus mirabilis*;
- b) *Acinetobacter baumannii*;
- c) *Klebsiella pneumoniae*;
- d) *Clostridium difficile*;
- e) *Escherichia coli*.

**995. Criterion for natural urine contamination is ...**

*Variants of answer:*

- a) no more than  $10^3$  CFU/ml;
- b)  $10^3$ – $10^5$  CFU/ml;
- c)  $10^6$  CFU/ml;
- d)  $10^5$  CFU/ml;
- e) more than  $10^5$  CFU/ml.

**996. Criterion for uncertain results of bacteriological investigation of urine is ...**

*Variants of answer:*

- a) no more than  $10^3$  CFU/ml;
- b)  $10^3$ – $10^5$  CFU/ml;
- c)  $10^6$  CFU/ml;
- d)  $10^5$  CFU/ml;
- e) more than  $10^5$  CFU/ml.

**997. Antimicrobial-resistant ESKAPE pathogens are ...**

*Variants of answer:*

a) *Enterobacter cloacae*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Proteus mirabilis*, *Escherichia coli*;

b) *Enterococcus faecalis*, *Staphylococcus epidermidis*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterococcus faecium*;

c) *Enterococcus faecium*, *Streptococcus pneumoniae*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Proteus vulgaris*, *Enterobacter spp.*;

d) *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterobacter spp.*;

e) *Enterococcus faecalis*, *Streptococcus agalactiae*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterococcus faecium*.

**998. Healthcare-associated infections are...**

*Variants of answer:*

a) bloodstream infections;

b) catheter-associated urinary tract infections;

c) ventilator-associated pneumonia;

d) surgical site infections;

e) all the mentioned variants.

**999. The most common Gram-negative causative agent of healthcare-associated infections is...**

*Variants of answer:*

a) *Klebsiella pneumoniae*;

b) *Proteus vulgaris*;

c) *Acinetobacter baumannii*;

d) *Proteus mirabilis*;

e) *Stenotrophomonas maltophilia*.

**1000. Patients with the highest risk of developing nosocomial infections are...**

*Variants of answer:*

a) burn patients;

b) surgical patients;

c) urology patients;

d) intensive care unit patients;

e) all the mentioned variants.

# ANSWERS

## CHAPTER 1 HISTORICAL STAGES. MORPHOLOGY, PHYSIOLOGY AND GENETICS OF MICROORGANISMS

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
1	b	64	b	127	e	190	b
2	a	65	b	128	b	191	e
3	c	66	c	129	d	192	a
4	b	67	a	130	c	193	c
5	a	68	c	131	c	194	c
6	c	69	a	132	a	195	d
7	d	70	b	133	e	196	c
8	b	71	c	134	d	197	a
9	b	72	e	135	a	198	e
10	a	73	e	136	b	199	d
11	a	74	c	137	c	200	e
12	d	75	b	138	c	201	b
13	a	76	c	139	a	202	a
14	c	77	c	140	b	203	e
15	b	78	e	141	a	204	e
16	c	79	d	142	b	205	d
17	e	80	b	143	c	206	e
18	b	81	a	144	b	207	a
19	d	82	c	145	d	208	e
20	b	83	c	146	d	209	d
21	b	84	d	147	b	210	a
22	d	85	c	148	a	211	c
23	c	86	d	149	c	212	c
24	d	87	a	150	b	213	b
25	e	88	d	151	d	214	a
26	a	89	e	152	a	215	c
27	a	90	e	153	e	216	c
28	e	91	a	154	e	217	a
29	d	92	c	155	a	218	d

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
30	d	93	e	156	a	219	b
31	c	94	d	157	e	220	c
32	b	95	c	158	c	221	e
33	e	96	a	159	d	222	b
34	a	97	b	160	d	223	a
35	b	98	e	161	e	224	a
36	a	99	c	162	e	225	d
37	c	100	c	163	a	226	a
38	c	101	d	164	b	227	b
39	a	102	a	165	b	228	a
40	d	103	e	166	a	229	d
41	d	104	c	167	b	230	b
42	e	105	c	168	d	231	b
43	d	106	a	169	d	232	a
44	b	107	b	170	e	233	a
45	a	108	d	171	a	234	d
46	c	109	e	172	a	235	c
47	d	110	b	173	e	236	c
48	d	111	d	174	c	237	c
49	c	112	d	175	c	238	c
50	b	113	e	176	e	239	d
51	e	114	c	177	c	240	b
52	b	115	a	178	b	241	c
53	a	116	c	179	d	242	d
54	e	117	b	180	b	243	c
55	a	118	b	181	c	244	d
56	d	119	e	182	a	245	d
57	e	120	d	183	d	246	d
58	e	121	b	184	b	247	c
59	d	122	c	185	d	248	b
60	c	123	b	186	e	249	d
61	b	124	b	187	b	250	b
62	a	125	d	188	c		
63	c	126	b	189	c		

**CHAPTER 2**  
**GENERAL INFECTOLOGY. THEORETICAL**  
**AND PRACTICAL MEDICAL IMMUNOLOGY**

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
251	a	314	c	377	b	440	b
252	d	315	b	378	d	441	c
253	c	316	e	379	b	442	e
254	c	317	d	380	a	443	c
255	c	318	a	381	a	444	d
256	b	319	b	382	c	445	e
257	b	320	e	383	d	446	b
258	a	321	d	384	b	447	a
259	c	322	a	385	d	448	c
260	a	323	d	386	b	449	e
261	e	324	b	387	c	450	c
262	b	325	e	388	b	451	a
263	d	326	a	389	d	452	d
264	e	327	d	390	a	453	e
265	b	328	e	391	d	454	b
266	e	329	c	392	c	455	e
267	a	330	d	393	e	456	b
268	d	331	e	394	a	457	c
269	a	332	b	395	c	458	e
270	e	333	b	396	b	459	d
271	b	334	e	397	c	460	c
272	b	335	a	398	e	461	b
273	d	336	a	399	c	462	e
274	b	337	b	400	d	463	b
275	e	338	b	401	e	464	a
276	b	339	a	402	c	465	e
277	c	340	c	403	b	466	c
278	e	341	e	404	a	467	d
279	b	342	a	405	a	468	c
280	b	343	c	406	a	469	b
281	d	344	b	407	c	470	d

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
282	e	345	e	408	d	471	b
283	a	346	a	409	b	472	d
284	b	347	d	410	c	473	b
285	a	348	b	411	d	474	b
286	d	349	e	412	c	475	c
287	e	350	e	413	b	476	a
288	b	351	c	414	a	477	c
289	e	352	d	415	c	478	c
290	c	353	b	416	b	479	d
291	a	354	d	417	d	480	d
292	d	355	a	418	d	481	c
293	e	356	e	419	d	482	c
294	c	357	a	420	b	483	c
295	a	358	b	421	d	484	a
296	b	359	c	422	e	485	c
297	d	360	d	423	b	486	b
298	d	361	a	424	d	487	b
299	c	362	d	425	d	488	a
300	a	363	c	426	b	489	c
301	d	364	d	427	a	490	b
302	d	365	b	428	c	491	c
303	d	366	c	429	d	492	b
304	b	367	d	430	e	493	a
305	c	368	e	431	c	494	c
306	d	369	d	432	b	495	b
307	b	370	b	433	c	496	a
308	e	371	e	434	e	497	a
309	a	372	b	435	a	498	c
310	b	373	a	436	b	499	e
311	d	374	c	437	e	500	d
312	c	375	a	438	d		
313	c	376	b	439	c		

**CHAPTER 3**  
**MEDICAL BACTERIOLOGY. MEDICAL MYCOLOGY**  
**AND PARASITOLOGY**

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
501	c	564	b	627	b	690	a
502	a	565	a	628	a	691	a
503	d	566	d	629	b	692	b
504	c	567	d	630	d	693	c
505	e	568	c	631	d	694	b
506	b	569	a	632	e	695	e
507	d	570	e	633	c	696	d
508	d	571	b	634	d	697	d
509	c	572	a	635	b	698	c
510	b	573	a	636	a	699	a
511	e	574	e	637	e	700	d
512	d	575	d	638	a	701	c
513	a	576	c	639	b	702	d
514	e	577	b	640	e	703	b
515	b	578	d	641	c	704	e
516	c	579	e	642	d	705	e
517	c	580	a	643	d	706	c
518	b	581	c	644	c	707	c
519	d	582	c	645	d	708	b
520	e	583	b	646	a	709	a
521	a	584	b	647	e	710	c
522	b	585	a	648	c	711	b
523	c	586	d	649	d	712	c
524	e	587	c	650	b	713	a
525	c	588	e	651	a	714	b
526	d	589	c	652	b	715	b
527	c	590	a	653	c	716	b
528	b	591	d	654	d	717	c
529	d	592	b	655	b	718	e
530	a	593	d	656	c	719	e
531	e	594	a	657	b	720	d

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
532	d	595	e	658	a	721	d
533	d	596	e	659	e	722	e
534	b	597	b	660	d	723	e
535	a	598	e	661	d	724	e
536	a	599	b	662	b	725	a
537	e	600	d	663	a	726	e
538	b	601	d	664	a	727	c
539	b	602	b	665	c	728	b
540	c	603	b	666	b	729	d
541	c	604	e	667	c	730	d
542	d	605	c	668	a	731	e
543	a	606	e	669	d	732	a
544	b	607	a	670	e	733	e
545	b	608	e	671	b	734	e
546	d	609	c	672	d	735	a
547	c	610	d	673	c	736	a
548	a	611	c	674	a	737	b
549	e	612	b	675	c	738	a
550	a	613	d	676	d	739	b
551	b	614	e	677	b	740	e
552	d	615	b	678	d	741	d
553	e	616	a	679	d	742	b
554	d	617	c	680	a	743	c
555	b	618	d	681	b	744	a
556	a	619	d	682	e	745	a
557	c	620	e	683	c	746	e
558	e	621	b	684	a	747	c
559	d	622	a	685	d	748	b
560	e	623	c	686	c	749	b
561	c	624	d	687	e	750	b
562	b	625	b	688	e		
563	a	626	d	689	c		

**CHAPTER 4**  
**GENERAL AND MEDICAL VIROLOGY**  
**CLINICAL MICROBIOLOGY**

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
751	d	814	b	877	a	940	a
752	e	815	d	878	c	941	a
753	b	816	b	879	b	942	a
754	e	817	a	880	a	943	c
755	b	818	d	881	b	944	b
756	c	819	b	882	e	945	c
757	a	820	b	883	d	946	b
758	d	821	b	884	c	947	b
759	c	822	b	885	c	948	d
760	a	823	a	886	d	949	b
761	b	824	c	887	e	950	a
762	b	825	d	888	a	951	b
763	c	826	b	889	c	952	e
764	d	827	b	890	d	953	e
765	a	828	e	891	c	954	b
766	c	829	e	892	c	955	c
767	e	830	e	893	d	956	c
768	c	831	a	894	b	957	b
769	d	832	b	895	c	958	b
770	d	833	d	896	b	959	c
771	e	834	a	897	d	960	e
772	b	835	c	898	d	961	b
773	a	836	b	899	d	962	c
774	a	837	c	900	d	963	d
775	b	838	e	901	b	964	b
776	d	839	b	902	c	965	b
777	e	840	c	903	d	966	a
778	b	841	d	904	b	967	c
779	a	842	e	905	a	968	e
780	d	843	b	906	d	969	d
781	a	844	a	907	c	970	e

№ question	Correct answer	№ question	Correct answer	№ question	Correct answer	№ question	Correct answer
782	d	845	d	908	b	971	d
783	e	846	b	909	b	972	c
784	e	847	a	910	b	973	e
785	a	848	a	911	b	974	a
786	e	849	c	912	c	975	b
787	a	850	a	913	c	976	d
788	b	851	a	914	e	977	e
789	c	852	b	915	d	978	a
790	b	853	e	916	e	979	c
791	c	854	d	917	c	980	a
792	c	855	c	918	d	981	c
793	b	856	b	919	c	982	e
794	c	857	a	920	b	983	c
795	a	858	a	921	d	984	d
796	a	859	d	922	d	985	d
797	a	860	d	923	c	986	a
798	c	861	e	924	e	987	a
799	c	862	d	925	c	988	e
800	a	863	b	926	b	989	c
801	e	864	a	927	a	990	d
802	c	865	e	928	b	991	e
803	c	866	b	929	d	992	e
804	d	867	d	930	a	993	c
805	b	868	c	931	c	994	e
806	b	869	a	932	a	995	a
807	e	870	c	933	e	996	b
808	c	871	a	934	c	997	d
809	d	872	c	935	d	998	e
810	a	873	c	936	e	999	a
811	d	874	a	937	b	1000	e
812	e	875	d	938	b		
813	c	876	e	939	e		

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