List of Questions for the Test
in discipline «Clinical Biochemistry»
for students of 2024 year of admission
under the educational programme
31.05.01 General Medicine,
profile General Medicine,
(Specialist's degree),
form of study full-time
for the 2025-2026 academic year

№	List of Questions for the Test
1.	Main laboratory research methods. Key objectives of laboratory examination. Structure and equipment of modern laboratories
2.	The concept of quality control in laboratory studies. Quality criteria. Diagnostic specificity and sensitivity of a test
3.	Features of internal and external laboratory quality control in the Volgograd region
4.	Types of biological material and collection conditions for clinical laboratory studies
5.	Features of blood collection for biochemical studies. Methods for obtaining blood plasma and serum, types of anticoagulants
6.	Features of urine collection for laboratory studies: urinalysis, Zimnitsky test, Nechiporenko test, Rehberg test, 24-hour urine collection, two-glass test
7.	Основные единицы СИ в биохимии. Средние показатели и референтные величины
8.	Basic SI units in biochemistry. Mean values and reference ranges
9.	Types of laboratory studies. Screening, preventive, and differential diagnostic studies. Rapid diagnostics
10.	Analytical, technical-economic, and diagnostic value of biochemical methods. Standardization of studies
11.	Liver functions and methods of their evaluation. Reference ranges of liver laboratory parameters specific to the population of the Volgograd region
12.	Clinical and biochemical syndromes in liver diseases. Criteria for laboratory diagnosis
13.	Enzyme diagnostics of liver diseases. Hyper- and hypo-fermentemia
14.	The significance of alanine and aspartate aminotransferases, lactate dehydrogenase, γ-glutamyltransferase, alkaline phosphatase, glutamate dehydrogenase, and sorbitol dehydrogenase in the diagnosis of liver diseases
15.	Jaundice: concept, types, characteristics, differential diagnosis. Hyperbilirubinemia and bilirubinuria
16.	Bilirubin metabolism. Free (indirect) and conjugated (direct) bilirubin, urobilinogen and stercobilinogen, bile pigments
17.	Bilirubin toxicity. Neonatal jaundice (physiological and hemolytic, jaundice in premature infants, non-hemolytic hyperbilirubinemia in newborns)
18.	Determination of total, free, and conjugated bilirubin concentrations. Reference values of bilirubin indicators in blood, urine, and feces of residents of the Volgograd region
19.	Protein composition of blood plasma. Functions of blood proteins
20.	Total protein in blood serum, hypo- and hyperproteinemia
21.	Characteristics of blood protein research methods, their advantages and disadvantages
22.	Albumins, hyper- and hypoalbuminemia. Characteristics of globulins. Hyper- and hypoglobulinemias

23.	Characteristics of acute-phase inflammatory proteins
24.	Proteinograms in various diseases (acute and chronic inflammations, hepatitis, malignant tumors, impaired renal filter, etc.)
25.	Pancreas: structure, functions. Insulin, its effect on metabolism. Assessment of pancreatic function. Determination of α-amylase, lipase, and trypsin activity
26.	Concept and forms of pancreatitis. Laboratory tests for acute and chronic pancreatitis
27.	Diabetes mellitus: definition, classification. Diagnostic criteria for type I and type II diabetes. Hyperglycemia and glucosuria
28.	Diagnostic criteria for type I and type II diabetes mellitus. Main symptoms and clinical manifestations
29.	Glucose levels in whole blood and plasma: differences. Hyperglycemia and glucosuria
30.	Impaired glucose tolerance: concept, diagnostic criteria for the glucose tolerance test. Impaired fasting glucose. Postprandial hyperglycemia
31.	Methods for determining blood glucose levels
32.	Early laboratory diagnosis of diabetes mellitus
33.	Criteria for diabetes compensation. Effective hyperglycemia control: determination of glycosylated hemoglobin and fructosamine
34.	Glycosylated hemoglobin, fructosamine: concept
35.	Metabolic syndrome: concept, characteristics. Lipid profile indicators in diabetes mellitus
36.	Hypoglycemic coma: causes of occurrence
37.	Classification and functions of lipids. Atherogenic and antiatherogenic lipoproteins
38.	Atherosclerosis: definition, risk factors, and stages of development
39.	Disorders of lipid metabolism. Dyslipoproteinemias. Hyperlipoproteinemias
40.	Diagnostic significance of cholesterol and its fractions in blood lipoproteins
41.	Investigation of lipid metabolism. Friedewald formula
42.	Determination of key atherosclerosis indicators: total cholesterol, α-cholesterol (HDL), atherogenic index. Recommended and borderline values of total cholesterol, moderate and severe hypercholesterolemia
43.	Recommended and borderline values for total cholesterol, moderate and severe hypercholesterolemia
44.	Stages of diagnosis of lipid metabolism disorders
45.	Coronary artery disease: concept, risk factors, causes of development
46.	Enzyme diagnostics of myocardial infarction
47.	Modern requirements for a marker of myocardial necrosis
48.	Myocardial infarction: definition, diagnostic criteria. Markers of acute myocardial infarction
49.	Laboratory diagnosis of angina pectoris, hypertensive disease
50.	Laboratory diagnosis of myocarditis, cardiomyopathies
51.	Kidney functions. Functional unit of the kidney. Filtration, reabsorption, clearance, renal threshold
52.	Urinalysis. Organized and unorganized urinary sediments. Reference values of urinary biochemical parameters for residents of the Volgograd region
53.	Physiological components of urine: urea, creatinine, creatine, uric acid. Methods for their determination
54.	Biochemical urine analysis in the diagnosis of kidney diseases. Clearance, transport maximum, renal threshold, functional indicators of kidney function. Diuresis and its disorders: polyuria, oliguria, anuria, nocturia
55.	Pathological components of urine: glucosuria, proteinuria and its types. Methods for their determination

56.	Clinical and laboratory syndromes of kidney damage. Characteristics
57.	Distribution of water in the body. Intracellular fluid. Extracellular fluid. Fluid compartments
58.	Assessment of positive and negative water balance in the body. Edema. Mechanisms of edema development in cardiovascular insufficiency and kidney diseases
59.	Methods for assessing water balance
60.	Osmotic and oncotic pressure. Determination of osmolality
61.	Types of water-electrolyte balance disorders. Causes. Characteristics. Criteria for laboratory diagnosis
62.	Regulation of sodium and water metabolism. Types of sodium metabolism disorders. Hyponatremia. Hypernatremia
63.	Role of potassium ions in the human body. Hyper- and hypokalemia, clinical manifestations. Calcium, hyper- and hypocalcemia in children and adults. Reference values for potassium and calcium ions in the blood of residents of the Volgograd region
64.	Hyper- and hypokalemia: clinical manifestations, diagnosis
65.	Calcium metabolism. Regulation of calcium metabolism. Hyper- and hypocalcemia in children and adults
66.	Role of phosphate ions in the human body, acid-soluble and acid-insoluble fractions. Hyper- and hypophosphatemia in children and adults
67.	Methods for determining mineral metabolism parameters
68.	Acid-base balance of the body: concept, characteristics. Blood buffer systems
69.	Role of physiological systems in maintaining acid-base balance
70.	Forms of acid-base balance disorders (alkalosis and acidosis: respiratory, metabolic, compensated, uncompensated). Characteristics. Laboratory indicators
71.	Clinical and diagnostic significance of acid-base balance parameters changes
72.	General clinical tests, rapid diagnostics of emergency conditions in anesthesiology and intensive care

Considered at the department meeting of Clinical Laboratory Diagnostics

protocol of «30» May 2025. № 14.

Head of the Departmen _____ B.V. Zavodovsky