

№	krok 2023
Topic	<u>Water- and fat-soluble vitamins</u>
Task	Examination of a patient shows decreased leukocyte and erythrocyte count and low hemoglobin levels in the peripheral blood, as well as appearance of large cells (mcgaloblasts). What vitamin is likely to be deficient in this case, causing this condition?
Correct answer	Folic acid
B	Biotin
C	Niacin
D	Ascorbic acid
E	Riboflavin
№	krok 2023
Topic	Nucleic acid exchange. Protein synthesis
Task	Laboratory diagnostics of hepatitis B has determined the presence of viral DNA in the patient's blood. What reaction is usually used for this purpose?
Correct answer	Polymerase chain reaction
B	Enzyme-linked immunosorbent assay
C	Complement fixation test
D	Hemagglutination inhibition test
E	Indirect hemagglutination test
№	krok 2023
Topic	Gas exchange mechanisms
Task	A 15-year-old patient complains of general weakness, dizziness, and rapid fatigability. Examination detects changed shape of erythrocytes and reduced erythrocyte count. A provisional diagnosis of sickle cell anemia was made. What amino acid replacement occurs in hemoglobin, causing the development of this pathological condition?
Correct answer	Glutamate becomes replaced with valine
B	Valine becomes replaced with aspartate
C	Glutamate becomes replaced with aspartate
D	Valine becomes replaced with glutamate
E	Glutamate becomes replaced with alanine
№	krok 2023
Topic	Nucleic acid exchange. Protein synthesis
Task	In the nucleus of a cell, a molecule of mature mRNA, which is smaller in size, was formed from a larger molecule of immature mRNA. The stages of this transformation together are called:

Correct answer	Processing
B	Replication
C	Translation
D	Recognition
E	Termination
№	krok 2023
Topic	<u>Hormonal regulation of metabolism</u>
Task	An anti-inflammatory drug that blocks cyclooxygenase activity was used in the treatment of a patient. What anti-inflammatory drug is it?
Correct answer	Aspirin (Acetylsalicylic acid)
B	Thiamine
C	Allopurinol
D	Analgin (Metamizole sodium)
E	Creatine
№	krok 2023
Topic	<u>Hormonal regulation of metabolism</u>
Task	Bioactive substances hormones are produced as a result of hydrolysis and modification of certain proteins. What protein in the pituitary gland is the source of lipotropin, corticotropin, melanotropin, and endorphin?
Correct answer	Proopiomelanocortin (POMC)
B	Neurostromin
C	Neuroalbumin
D	Thyroglobulin
E	Neuroglobulin
№	krok 2023
Topic	<u>Catabolism of carbohydrates</u>
Task	A 7-year-old child was diagnosed with anemia. Laboratory testing detects pyruvate kinase deficiency in the erythrocytes. What process is disturbed in this case, playing the main role in the anemia development?
Correct answer	Anaerobic glycolysis
B	Gluconeogenesis
C	Anaerobic glycogenolysis
D	Amino acid decarboxylation
E	Amino acid deamination

№	krok 2023
Topic	<u>Mechanism of tissue respiration. Peroxide and microsomal oxidation</u>
Task	Copper deficiency has an effect on energy metabolism in the human body. What substance becomes deficient as a result of this process?
Correct answer	Cytochrome oxidase
B	Pyruvate carboxylase
C	Lactate dehydrogenase
D	Arginase
E	Succinate dehydrogenase
№	krok 2023
Topic	<u>Catabolism of carbohydrates</u>
Task	In adipocytes of adipose tissue, the pentose-phosphate pathway has the nature of a cycle. What is the main function of this cycle in adipose tissue?
Correct answer	Production of ribose phosphates
B	Neutralization of xenobiotics
C	Energy generation
D	Oxidation of glucose to end products
E	Generation of NADPH <sub>2</sub>
№	krok 2023
Topic	<u>Water- and fat-soluble vitamins</u>
Task	A patient has been prescribed pyridoxal phosphate. This drug is recommended for correction of the following processes:
Correct answer	Transamination and decarboxylation of amino acids
B	Oxidative decarboxylation of keto acids
C	Deamination of purine nucleotides
D	Protein synthesis
E	Synthesis of purine and pyrimidine bases
№	krok 2023
Topic	<u>Nucleic acid exchange. Protein synthesis</u>
Task	A patient with leukemia was prescribed 5-fluorouracil. What is the mechanism of action of this drug?
Correct answer	DNA synthesis inhibition
B	Translation inhibition
C	Transcription inhibition

D	Replication catalysis
E	DNase stimulation
№	krok 2023
Topic	<u>Cholesterol exchange. Ketone bodies</u>
Task	A patient diagnosed with diabetes mellitus presents with increased levels of ketone bodies in the blood. From what compound are ketone bodies synthesized?
Correct answer	Acetyl-CoA
B	Acyl-CoA
C	Succinyl-CoA
D	Butyryl-CoA
E	Oxyacyl-CoA
№	krok 2023
Topic	Hormonal regulation of metabolism
Task	The height of a 10-year-old child is 178 cm, while the child's weight is 64 kg. What endocrine gland is dysfunctional in the child, causing this condition?
Correct answer	Pituitary gland
B	Parathyroid gland
C	Gonads
D	Thyroid gland
E	Adrenal glands
№	krok 2023
Topic	<u>Water- and fat-soluble vitamins</u>
Task	A patient presents with impaired twilight vision. What vitamin preparation should be prescribed to this patient?
Correct answer	Retinol acetate
B	Ascorbic acid
C	Pyridoxine hydrochloride
D	Nicotinic acid
E	Cyanocobalamin
№	krok 2023
Topic	<u>Nutritional biochemistry and general characteristics of vitamins</u>
Task	A man was hospitalized with provisional diagnosis of acute pancreatitis. What enzyme activity must be measured in the patient's blood and urine to confirm this diagnosis?

Correct answer	$\alpha$ -amylase
B	AST
C	Cholinesterase
D	Lactate dehydrogenase
E	ALT
№	krok 2023
Topic	<u>Hormonal regulation of metabolism</u>
Task	Residents of areas with a cold climate have increased blood levels of a certain hormone that has an adaptive thermoregulatory value. What hormone is it?
Correct answer	Thyroxine
B	Insulin
C	Glucagon
D	Somatotropin
E	Cortisol
№	krok 2023
Topic	<u>Specific ways of amino acid exchange</u>
Task	A patient was prescribed a drug with methionine to maintain liver function. Synthesis of what substance is ensured in this case?
Correct answer	Phosphatidylcholine
B	Citrate
C	Phosphatidylserine
D	Pyruvate
E	Lactate
№	krok 2023
Topic	<u>Catabolism of carbohydrates</u>
Task	A child with von Gierke disease presents with slow growth and enlarged liver and kidneys. Reduced glucose levels and increased levels of fats and uric acid are detected in the child's blood. What enzyme is absent in this case, causing this type of glycogenosis?
Correct answer	Glucose-6-phosphatase
B	Glycogen synthase
C	Amylo-1,6-glucosidase
D	Hepatic phosphorylase
E	Phosphofructokinase
№	krok 2023

Topic	<u>Functional and clinical biochemistry of muscles, nervous and connective tissues</u>
Task	In the human body, reserves of hydrocarbons are localized mainly in the liver and skeletal muscles. Which reserve becomes mobilized to maintain blood glucose levels during fasting?
Correct answer	Muscle glycogen
B	Amylopectin
C	Hepatic glycogen
D	Starch
E	Cellulose
№	krok 2023
Topic	<u>Catabolism of carbohydrates</u>
Task	Numerous glucose oxidation metabolites are dissolved in the cytoplasm of myocytes. Which one of those metabolites directly converts into lactate?
Correct answer	Pyruvate
B	Glycerophosphate
C	Oxaloacetate
D	Fructose-6-phosphate
E	Glucose-6-phosphate
№	krok 2023
Topic	<u>Hormonal regulation of metabolism</u>
Task	The corpus luteum forms during the luteal phase of the menstrual cycle. This temporary endocrine gland stimulates the synthesis of a certain hormone. What hormone is it?
Correct answer	Progesterone
B	Corticosterone
C	Parathyroid hormone
D	Aldosterone
E	Testosterone
№	krok 2023
Topic	<u>Nucleotide exchange</u>
Task	A 55-year-old patient complains of pain in the joints that becomes worse before changes in the weather. Blood tests detect high levels of uric acid. What substance is breaking down, likely causing this condition in the patient?
Correct answer	Adenosine monophosphate
B	-

C	Thymidine monophosphate
D	Cytidine monophosphate
E	Uridine monophosphate
№	krok 2023
Topic	Nucleic acid exchange. Protein synthesis
Task	There are several stages in the process of translation. At one of these stages, a complex forms that consists of a ribosome, mRNA, and aminoacyl-tRNA-methionine. What is the name of this stage?
Correct answer	Initiation
B	Elongation
C	Repair
D	Transcription
E	Termination
№	krok 2023
Topic	Characteristics of the hemostasis system and immune processes
Task	A patient complains of frequent bleeding from the gums. Blood test detects deficiency of blood coagulation factor II (prothrombin). What phase of blood coagulation is primarily disturbed in this patient?
Correct answer	Thrombin formation
B	Fibrinolysis
C	Fibrin formation
D	Prothrombinase formation
E	Clot retraction
№	krok 2023
Topic	Characteristics of the hemostasis system and immune processes
Task	A child with hemorrhagic syndrome was diagnosed with hemophilia B. What coagulation factor is deficient in this case, causing this type of hemophilia in the patient?
Correct answer	IX (Christmas factor)
B	XI (prothromboplastin)
C	XII (Hageman factor)
D	VIII (antihemophilic globulin)
E	II (prothrombin)
№	krok 2023
Topic	Hormonal regulation of metabolism

Task	Chemically, thyroid hormones (thyroxine and triiodothyronine) are amino acid derivatives. Name this amino acid.
Correct answer	Tyrosine
B	Methionine
C	Proline
D	Threonine
E	Tryptophan
№	krok 2023
Topic	<u>Hormonal regulation of metabolism</u>
Task	Examination of a 32-year-old patient detects a disproportional structure of the skeleton and enlarged brow ridges, nose, lips, tongue, jawbones, and feet. What is the likely cause of the development of these disorders?
Correct answer	Increased levels of somatotrophic hormone
B	Increased thyroxine levels
C	Decreased insulin levels
D	Increase catecholamine levels
E	Increase glucagon levels
№	krok 2023
Topic	<u>Nutritional biochemistry and general characteristics of vitamins</u>
Task	Problems with the processes of lipid breakdown in small intestine are caused by disturbed lipase activity. What factor activates lipase?
Correct answer	Bile acids
B	Enterokinase
C	Na <sup>+</sup> salts
D	Pepsin
E	Hydrochloric acid
№	krok 2023
Topic	<u>Water- and fat-soluble vitamins</u>
Task	A certain vitamin, as a coenzyme, is a component of glutamic acid decarboxylase, it takes part in GABA formation and its deficiency can cause convulsions. Name this vitamin.
Correct answer	Pyridoxine
B	Folic acid
C	Tocopherol



D	Ascorbic acid
E	Cobalamin
№	krok 2023
Topic	<u>Water- and fat-soluble vitamins</u>
Task	How can vitamin <i>D</i> deficiency manifest in an adult?
Correct answer	Osteoporosis
B	Neurological disorders
C	Problems with twilight vision
D	Rickets
E	Anemia
№	krok 2023
Topic	<u>Specific ways of amino acid exchange</u>
Task	The patient's body fluids, especially urine, have a specific sweet smell, caused by disturbed metabolism of certain amino acids, such as leucine, isoleucine, and valine. What disease can be characterized by these pathological changes?
Correct answer	Maple syrup urine disease
B	Phenylketonuria
C	Fructosuria
D	Alkaptonuria
E	Galactosemia
№	krok 2023
Topic	<u>Hormonal regulation of metabolism</u>
Task	У больного нарушена реабсорбция воды в почках, что напрямую связано с нарушением секреции определенного гормона. Назовите этот гормон.
Correct answer	Vasopressin
B	Parathyroid hormone
C	Thyrocalcitonin
D	Natriuretic hormone
E	Aldosterone
№	krok 2023
Topic	<u>Hormonal regulation of metabolism</u>
Task	A 55-year-old patient is being monitored by an endocrinologist for disturbed endocrine function of the pancreas, which manifests as a decrease in glucagon levels in the blood. What pancreatic cells are dysfunctional in this case?

Correct answer	Alpha cells of the islets of Langerhans
B	Delta-1 cells of the islets of Langerhans
C	Delta cells of the islets of Langerhans
D	Beta cells of the islets of Langerhans
E	PP cells of the islets of Langerhans
№	krok 2023
Topic	<u>Nutritional biochemistry and general characteristics of vitamins</u>
Task	Pepsin is the enzyme of gastric juice that is secreted in its inactive form of pepsinogen. What is the mechanism of its activation?
Correct answer	Limited proteolysis
B	Methylalation
C	Acetylation
D	Dephosphorylation
E	Phosphorylation
№	krok 2017
Topic	Classification and mechanism of action of enzymes
Task	Protective function of saliva is based on several mechanisms, including the presence of enzyme that has bactericidal action and causes lysis of complex capsular polysaccharides of staphylococci and streptococci. Name this enzyme:
Correct answer	Lysozyme
B	Alpha-amylase
C	Oligo-1,6-glucosidase
D	Collagenase
E	Beta-glucuronidase
№	krok 2017
Topic	Nutrition biochemistry and vitamins fundamental
Task	A pregnant woman with several miscarriages in anamnesis is prescribed a therapy that includes vitamin preparations. What vitamin facilitates carrying of a pregnancy?
Correct answer	Alpha-tocopherol
B	Folic acid
C	Cyanocobalamin
D	Pyridoxal phosphate
E	Rutin
№	krok 2017, 2014

Topic	Characteristics of the hemostasis system and immune processes
Task	A 3-year-old boy with pronounced hemorrhagic syndrome has no anti-hemophilic globulin A (factor VIII) in the blood plasma. Hemostasis has been impaired at the following stage:
Correct answer	Internal mechanism of prothrombinase activation
B	External mechanism of prothrombinase activation
C	Conversion of prothrombin to thrombin
D	Conversion of fibrinogen to fibrin
E	Blood clot retraction
№	krok 2017
Topic	Anabolism of carbohydrates
Task	A child with point mutation presents with absence of glucose 6-phosphatase, hypoglycemia, and hepatomegaly. What pathology are these signs characteristic of?
Correct answer	Von Gierke's disease (Glycogen storage disease type I)
B	Cori's disease (Glycogen storage disease type III)
C	Addison's disease (Primary adrenal insufficiency)
D	Parkinson's disease
E	McArdle's disease (Glycogen storage disease type V)
№	krok 2017
Topic	Blood fundamental
Task	Blood test of the patient revealed albumine content of 20 g/l and increased activity of lactate dehydrogenase isoenzyme 5 (LDH <sub>5</sub> ). These results indicate disorder of the following organ:
Correct answer	Liver
B	Kidneys
C	Heart
D	Lungs
E	Spleen
№	krok 2017
Topic	Functional and clinical biochemistry of liver
Task	A 46-year-old woman suffering from cholelithiasis developed jaundice. Her urine became dark yellow, while feces are light-colored. What substance will be the most increased in concentration in the blood serum in this case?
Correct answer	Conjugated bilirubin

B	Unconjugated bilirubin
C	Biliverdine
D	Mesobilirubin
E	Urobilinogen
№	krok 2017
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A traumatology unit received a patient with crushed muscular tissue. What biochemical indicator of urine will be raised in this case?
Correct answer	Creatinine
B	Total lipids
C	Glucose
D	Mineral salts
E	Uric acid
№	krok 2017
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 30-year-old woman first developed pain, swelling, and skin redness in the area of joints about a year ago. Provisional diagnosis is rheumatoid arthritis. One of the likely causes of this disease is change in the structure of the following connective tissue protein:
Correct answer	Collagen
B	Mucin
C	Myosin
D	Ovalbumin
E	Troponin
№	krok 2017
Topic	Transamination and ammonia conversion
Task	Nitrogen is being excreted from the body mainly as urea. When activity of a certain enzyme in the liver is low, it results in inhibition of urea synthesis and nitrogen accumulation in blood and tissues. Name this enzyme:
Correct answer	Carbamoyl phosphate synthetase
B	Aspartate aminotransferase
C	Urease
D	Amylase
E	Pepsin
№	krok 2017
Topic	Characteristics of the hemostasis system and immune processes

Task	After pancreatic surgery the patient developed hemorrhagic syndrome with disturbed 3rd stage of blood clotting. What will be the most likely mechanism of the hemostatic disorder?
Correct answer	Fibrinolysis activation
B	Decrease of prothrombin synthesis
C	Decrease of fibrinogen synthesis
D	Qualitative abnormalities of fibrinogenesis
E	Fibrinstabilizing factor deficiency
№	krok 2017
Topic	Functional and clinical biochemistry of liver
Task	A patient with jaundice has high total bilirubin that is mainly indirect (unconjugated), high concentration of stercobilin in the feces and urine. The level of direct (conjugated) bilirubin in the blood plasma is normal. What type of jaundice can be suspected?
Correct answer	Hemolytic
B	Parenchymal (hepatic)
C	Mechanical
D	Neonatal
E	Gilbert's disease
№	krok 2017
Topic	Nucleotide metabolism
Task	A patient suffering from gout was prescribed allopurinol. What pharmacological property of allopurinol provides therapeutic effect in this case?
Correct answer	Competitive inhibition of xanthine oxidase
B	Acceleration of nitrogen-containing substances excretion
C	Acceleration of pyrimidine nucleotides catabolism
D	Deceleration of pyrimidine nucleotides salvage
E	Acceleration of nucleic acids synthesis
№	krok 2017
Topic	Characteristics and intracellular lipid metabolism
Task	Blood of the patients with diabetes mellitus shows increased content of free fatty acids. Name the most likely cause of this:
Correct answer	Increased activity of adipose triglyceride lipase
B	Accumulation of palmitoyl-CoA in cytosol
C	Activation of ketone bodies utilization
D	Activation of apoA1, apoA2, and apoA4 apolipoprotein synthesis

E	Decreased activity of plasma phosphatidylcholine-cholesterol-acyltransferase
№	krok 2017
Topic	Nutrition biochemistry and vitamins fundamental
Task	To lose some weight a woman has been limiting the amount of products in her diet. 3 months later she developed edemas and her diuresis increased. What dietary component deficiency is the cause of this?
Correct answer	Proteins
B	Fats
C	Carbohydrates
D	Vitamins
E	Minerals
№	krok 2017
Topic	Hormonal regulation of metabolism
Task	A 40-year-old woman with Cushing's disease presents with steroid diabetes. On biochemical examination she has hyperglycemia and hypochloremia. What process activates in the first place in such patients?
Correct answer	Gluconeogenesis
B	Glycogenolysis
C	Glucose reabsorption
D	Glucose transportation into a cell
E	Glycolysis
№	krok 2017
Topic	Nutrition biochemistry and vitamins fundamental
Task	During regular check-up a child is determined to have interrupted mineralization of the bones. What vitamin deficiency can be the cause?
Correct answer	Calciferol
B	Riboflavin
C	Tocopherol
D	Folic acid
E	Cobalamin
№	krok 2017
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Depression and emotional disturbances result from the lack of noradrenaline, serotonin, and other biogenic amines in the brain. Their content in the synapses can be increased through administration of antidepressants that inhibit the following enzyme:

Correct answer	Monoamine oxidase
B	Diamine oxidase
C	L-amino acids oxidase
D	D-amino acid oxidase
E	Phenylalanine 4-monooxygenase
№	krok 2017
Topic	Characteristics and intracellular lipid metabolism
Task	A 2-year-old child presents with acute psychomotor retardation, vision and hearing impairment, sharp enlargement of the liver and spleen. The child is diagnosed with hereditary Niemann-Pick disease. What genetic defect is the cause of this disease?
Correct answer	Sphingomyelinase deficiency
B	Glucose 6-phosphatase deficiency
C	Amylo-1,6-glucosidase deficiency
D	Acid lipase deficiency
E	Xanthine oxidase deficiency
№	krok 2017
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient presents with steatorrhea. This disorder can be linked to disturbed supply of the intestine with the following substances:
Correct answer	Bile acids
B	Carbohydrates
C	Tripsin
D	Chymotrypsin
E	Amylase
№	krok 2017
Topic	The mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	Cytochrome oxidase is a heme protein that is an end component of the mitochondrial respiratory chain. What reaction is catalyzed with this enzyme?
Correct answer	Transfer of reduced equivalents to molecular oxygen
B	Cytochrome synthesis
C	Transfer of reduced equivalents to ubiquinone
D	Cytochrome splicing
E	Adenosine triphosphate synthesis
№	krok 2017, 2016

Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient, who has been subsisting exclusively on polished rice, has developed polyneuritis due to thiamine deficiency. What substance is an indicator of such avitaminosis, when it is excreted with urine?
Correct answer	Pyruvic acid
B	Malate
C	Methylmalonic acid
D	Uric acid
E	Phenyl pyruvate
№	krok 2017
Topic	Catabolism of carbohydrates
Task	It is known that pentosephosphate pathway actively functions in the erythrocytes. What is the main function of this metabolic pathway in the erythrocytes?
Correct answer	Counteraction to lipid peroxidation
B	Activation of microsomal oxidation
C	Neutralization of xenobiotics
D	Oxidation of glucose into lactate
E	Increase of lipid peroxidation
№	krok 2017, 2013
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Inherited diseases, such as mucopolysaccharidoses, manifest in metabolic disorders of connective tissue, bone and joint pathologies. The sign of this disease is the excessive urinary excretion of the following substance:
Correct answer	Glycosaminoglycans
B	Amino acids
C	Glucose
D	Lipids
E	Urea
№	krok 2017
Topic	Nucleic acid metabolism. Protein synthesis
Task	Streptomycin and other aminoglycosides prevent the joining of formyl-methionyl-tRNA by bonding with the 30S ribosomal subunit. This effect leads to disruption of the following process:
Correct answer	Translation initiation in procaryotes
B	Translation initiation in eucaryotes



C	Transcription initiation in procaryotes
D	Transcription initiation in eucaryotes
E	Replication initiation in procaryotes
№	krok 2017, 2014, 2013
Topic	Blood fundamental
Task	A 67-year-old man consumes eggs, pork fat, butter, milk and meat. Blood test results: cholesterol - 12,3 mmol/l, total lipids - 8,2 g/l, increased low-density lipoprotein fraction (LDL). What type of hyperlipoproteinemia is observed in the patient?
Correct answer	Hyperlipoproteinemia type IIa
B	Hyperlipoproteinemia type I
C	Hyperlipoproteinemia type IIb
D	Hyperlipoproteinemia type IV
E	Cholesterol, hyperlipoproteinemia
№	krok 2017
Topic	Nutrition biochemistry and vitamins fundamental
Task	Ionizing radiation or vitamin E deficiency affect the cell by increasing lysosome membrane permeability. What are the possible consequences of this pathology?
Correct answer	Partial or complete cell destruction
B	Intensive protein synthesis
C	Intensive energy production
D	Restoration of cytoplasmic membrane
E	Formation of maturation spindle
№	krok 2017, 2014
Topic	Functional and clinical biochemistry of liver
Task	A patient has been admitted to the contagious isolation ward with signs of jaundice caused by hepatitis virus. Which of the symptoms given below is strictly specific for hepatocellular jaundice?
Correct answer	Increase of ALT, AST level
B	Hyperbilirubinemia
C	Bilirubinuria
D	Cholemia
E	Urobilinuria
№	krok 2017
Topic	Nutrition biochemistry and vitamins fundamental

Task	An infant, who was on synthetic formula feeding, developed signs of vitamin $B_1$ deficiency. What reactions does this vitamin take part in?
Correct answer	Keto acids oxidative decarboxylation
B	Amino acids transamination
C	Amino acids decarboxylation
D	Proline hydroxylation
E	Redox reactions
№	krok 2017
Topic	Blood fundamental
Task	During examination of a teenager with xanthomatosis the family history of hypercholesterolemia is revealed. What transportable lipids are increased in concentration in case of such a disease?
Correct answer	Low-density lipoproteins
B	Chylomicrons
C	Very low-density lipoproteins
D	High-density lipoproteins
E	Intermediate-density lipoproteins
№	krok 2016, 2015
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Characteristic sign of glycogenosis is muscle pain during physical work. Blood examination usually reveals hypoglycemia. This pathology is caused by congenital deficiency of the following enzyme:
Correct answer	Glycogen phosphorylase
B	Glucose 6-phosphate dehydrogenase
C	$\alpha$ -amylase
D	$\gamma$ -amylase
E	Lysosomal glycosidase
№	krok 2016
Topic	The mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	The process of metabolism in the human body produces active forms of oxygen, including superoxide anion radical $O_2^-$ . This anion is inactivated by the following enzyme:
Correct answer	Superoxide dismutase
B	Catalase

C	Peroxidase
D	Glutathione peroxidase
E	Glutathione reductase
№	krok 2016
Topic	Functional and clinical biochemistry of liver
Task	A 15-year-old boy has been diagnosed with acute viral hepatitis. What blood value should be determined to confirm acute affection of hepatic cells?
Correct answer	Aminotransferase activity (AST, ALT)
B	Unconjugated and conjugated bilirubin content
C	Erythrocytes sedimentation rate (ESR)
D	Cholesterol content
E	Protein fraction content
№	krok 2016
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 53-year-old man is diagnosed with Paget's disease. Concentration of oxyproline in daily urine is sharply increased, which primarily means intensified disintegration of:
Correct answer	Collagen
B	Keratin
C	Albumin
D	Hemoglobin
E	Fibrinogen
№	krok 2016
Topic	Functional and clinical biochemistry of liver
Task	An infant born prematurely 2 days ago presents with yellow coloring of skin and mucosa. Such a condition in the infant is caused by temporary deficiency of the following enzyme:
Correct answer	UDP-glucuronyl transferase
B	Aminolevulinate synthase
C	Heme oxygenase
D	Heme synthetase
E	Biliverdine reductase
№	krok 2016
Topic	Nutrition biochemistry and vitamins fundamental

Task	It has been determined that one of a pesticide components is sodium arsenate that blocks lipoic acid. Enzyme activity can be impaired by this pesticide. Name this enzyme:
Correct answer	Pyruvate dehydrogenase complex
B	Microsomal oxidation
C	Methemoglobin reductase
D	Glutathione peroxidase
E	Glutathione reductase
№	krok 2016
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 50-year-old woman diagnosed with cardiac infarction has been delivered into an intensive care ward. What enzyme will be the most active during the first two days?
Correct answer	Aspartate aminotransferase
B	Alanine aminotransferase
C	Alanine aminopeptidase
D	<i>LDH<sub>4</sub></i>
E	<i>LDH<sub>5</sub></i>
№	krok 2016
Topic	Mechanisms of urine formation. Pathological components in urine
Task	A patient consulted a doctor with complaints of dyspnea occurring after physical exertion. Physical examination revealed anemia, paraprotein was detected among gamma globulins. What value should be determined in the patient's urine to confirm the diagnosis of myeloma?
Correct answer	Bence Jones protein
B	Bilirubin
C	Hemoglobin
D	Ceruloplasmin
E	Antitrypsin
№	krok 2016
Topic	Functional and clinical biochemistry of liver
Task	A 16-year-old adolescent is diagnosed with hereditary UDP (uridine diphosphate) glucuronyltransferase deficiency. Laboratory tests revealed hyperbilirubinemia caused mostly by increased blood content of the following substance:
Correct answer	Unconjugated bilirubin

B	Conjugated bilirubin
C	Urobilinogen
D	Stercobilinogen
E	Biliverdine
№	krok 2016
Topic	Specific ways of amino acids metabolism
Task	A 7-year-old child in the state of allergic shock caused by a bee sting has been delivered into an emergency ward. High concentration of histamine was observed in blood. Production of this amine was the result of the following reaction:
Correct answer	Decarboxylation
B	Hydroxylation
C	Dehydrogenation
D	Deaminization
E	Reduction
№	krok 2016
Topic	The mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	Human red blood cells contain no mitochondria. What is the main pathway for ATP production in these cells?
Correct answer	Anaerobic glycolysis
B	Aerobic glycolysis
C	Oxidative phosphorylation
D	Creatine kinase reaction
E	Cyclase reaction
№	krok 2016, 2015
Topic	Mechanisms of gas metabolism
Task	Along with normal hemoglobin types there can be pathological ones in the organism of an adult. Name one of them:
Correct answer	HbS
B	HbF
C	HbA <sub>1</sub>
D	HbA <sub>2</sub>
E	HbO <sub>2</sub>
№	krok 2016
Topic	Characteristics and intracellular lipid metabolism

Task	The key reaction of fatty acid synthesis is production of malonyl-CoA. What metabolite is the source of malonyl-CoA synthesis?
Correct answer	Acetyl-CoA
B	Succinyl-CoA
C	Acyl-CoA
D	Malonate
E	Citrate
№	krok 2016
Topic	Transamination and ammonia conversion
Task	It is known that in catecholamine metabolism a special role belongs to monoamine oxidase (MAO). This enzyme inactivates mediators (noreadrenalin, adrenalin, dopamine) by:
Correct answer	Oxidative deamination
B	Adjoining amino groups
C	Removing methyl groups
D	Carboxylation
E	Hydrolysis
№	krok 2016, 2015
Topic	Catabolism of carbohydrates
Task	When blood circulation in the damaged tissue is restored, lactate accumulation stops and glucose consumption decelerates. These metabolic changes are caused by activation of the following process:
Correct answer	Aerobic glycolysis
B	Anaerobic glycolysis
C	Lipolysis
D	Gluconeogenesis
E	Glycogen biosynthesis
№	krok 2016
Topic	Nucleic acid metabolism. Protein synthesis
Task	Cells of a person working in the Chernobyl Exclusion Zone have undergone a mutation in DNA molecule. However, with time the damaged interval of DNA molecule has been restored to its initial structure with a specific enzyme. In this case the following occurred:
Correct answer	Repair
B	Replication
C	Transcription
D	Reverse transcription

E	Translation
№	krok 2016
Topic	Mechanism of hormonal action. Thyroid and parathyroid glands hormones
Task	Leading symptoms of primary hyperparathyroidism are osteoporosis and renal damage resulting in urolithiasis development. What substances are the basis of uroliths in such cases?
Correct answer	Calcium phosphate
B	Uric acid
C	Cystine
D	Bilirubin
E	Cholesterol
№	krok 2016
Topic	Nutrition biochemistry and vitamins fundamental
Task	After an extended treatment with sulfanamides a patient has developed macrocytic anemia. Production of active forms of the following vitamin is disrupted in such a condition:
Correct answer	Folic acid
B	Thiamine
C	Riboflavin
D	Pyridoxine
E	Cyanocobalamin
№	krok 2016
Topic	Characteristics and intracellular lipid metabolism
Task	A 3-year-old girl with mental retardation has been diagnosed with sphingomyelin lipidosis (Niemann-Pick disease). In this condition synthesis of the following substance is disrupted:
Correct answer	Sphingomyelinase
B	Glycosyltransferase
C	Sphingosine
D	Ceramides
E	Gangliosides
№	krok 2016, 2015
Topic	Nucleotide metabolism
Task	A therapist has an appointment with a 40-year-old patient complaining of recurrent pain attacks in his hallux joints and their swelling. Urine analysis revealed its marked acidity and pink color. What substances can cause such changes in urine?

Correct answer	Uric acid salt
B	Chlorides
C	Ammonium salts
D	Calcium phosphate
E	Magnesium sulfate
№	krok 2016
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient presents with dry peeling skin, frequent cases of acute respiratory diseases, xerophthalmia. What vitamin preparation should be prescribed in this case?
Correct answer	Retinol acetate
B	Thiamine
C	Cyanocobalamin
D	Menadione (Vikasolum)
E	Ergocalciferol
№	krok 2016
Topic	Characteristics of the hemostasis system and immune processes
Task	Activation of a number of hemostatic factors occurs through their joining with calcium ions. What structural component allows for adjoining of calcium ions?
Correct answer	Gamma-carboxyglutamic acid
B	Gamma-aminobutyric acid
C	Gamma-oxybutyric acid
D	Hydroxyproline
E	Monoaminedicarboxylic acids
№	krok 2016, 2015
Topic	: Nutrition biochemistry and vitamins fundamental
Task	A 6-year-old child suffers from delayed growth, disrupted ossification processes, decalcification of the teeth. What can be the cause?
Correct answer	Vitamin D deficiency
B	Decreased glucagon production
C	Insulin deficiency
D	Hyperthyroidism
E	Vitamin C deficiency
№	krok 2016



Topic	Catabolism of carbohydrates
Task	Fructosuria is known to be connected with inherited deficiency of fructose 1-phosphate aldolase. What product of fructose metabolism will accumulate in the organism resulting in toxic action?
Correct answer	Fructose 1-phosphate
B	Glucose 1-phosphate
C	Glucose 6-phosphate
D	Fructose 1,6-biphosphate
E	Fructose 6-phosphate
№	krok 2016, 2015
Topic	Cholesterol metabolism. Ketone bodies
Task	Cholesterol content in blood serum of a 12-year-old boy is 25 mmol/l. Anamnesis states hereditary familial hypercholesterolemia caused by synthesis disruption of receptor-related proteins for:
Correct answer	Low-density lipoproteins
B	High-density lipoproteins
C	Chylomicrons
D	Very low-density lipoproteins
E	Middle-density lipoproteins
№	krok 2016
Topic	Nutrition biochemistry and vitamins fundamental
Task	Coenzym A participates in numerous important metabolic reactions. It is a derivative of the following vitamin:
Correct answer	Pantothenic acid
B	Thiamine
C	Niacin
D	Calciferol
E	Ubiquinone
№	krok 2015, 2012
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 46-year-old female patient has continuous history of progressive muscular (Duchenne's) dystrophy. Which blood enzyme changes will be of diagnostic value in this case?
Correct answer	Creatine phosphokinase
B	Lactate dehydrogenase
C	Pyruvate dehydrogenase

D	Glutamate dehydrogenase
E	Adenylate cyclase
№	krok 2015, 2010
Topic	Catabolism of carbohydrates
Task	Untrained people often have muscle pain after sprints as a result of lactate accumulation. This can be caused by intensification of the following biochemical process:
Correct answer	Glycolysis
B	Gluconeogenesis
C	Pentose phosphate pathway
D	Lipogenesis
E	Glycogenesis
№	krok 2015, 2014
Topic	Cholesterol metabolism. Ketone bodies
Task	Increased HDL levels decrease the risk of atherosclerosis. What is the mechanism of HDL antiatherogenic action?
Correct answer	They remove cholesterol from tissues
B	They supply tissues with cholesterol
C	They are involved in the breakdown of cholesterol
D	They activate the conversion of cholesterol to bile acids
E	They promote absorption of cholesterol in the intestine
№	krok 2015, 2014
Topic	Nutrition biochemistry and vitamins fundamental
Task	It has been found out that one of a pesticide components is sodium arsenate that blocks lipoic acid. Which enzyme activity is impaired by this pesticide?
Correct answer	Pyruvate dehydrogenase complex
B	Microsomal oxidation
C	Methemoglobin reductase
D	Glutathione peroxidase
E	Glutathione reductase
№	krok 2015
Topic	Functional and clinical biochemistry of liver
Task	A 16-year-old adolescent is diagnosed with hereditary UDP (uridine diphosphate) glucuronyltransferase deficiency. Laboratory tests revealed hyperbilirubinemia caused mostly by increased blood content of the following substance:

Correct answer	Unconjugated bilirubin
B	Conjugated bilirubin
C	Urobilinogen
D	Stercobilinogen
E	Biliverdine
№	krok 2015
Topic	Hormonal regulation of metabolism
Task	Prior to glucose utilization in cells it is transported inside cells from extracellular space through plasmatic membrane. This process is stimulated by the following hormone:
Correct answer	Insulin
B	Glucagon
C	Thyroxin
D	Aldosterone
E	Adrenalin
№	krok 2015
Topic	Specific ways of amino acids metabolism
Task	To an emergency ward a 7-year-old child was delivered in the condition of allergic shock caused by a bee sting. High concentration of histamine is observed in blood. Production of this amine is the result of the following reaction:
Correct answer	Decarboxylation
B	Hydroxylation
C	Dehydrogenation
D	Deamination
E	Reduction
№	krok 2015
Topic	Nucleotide metabolism
Task	A 65-year-old man suffering from gout complains of pain in his kidneys. Ultrasonic examination revealed kidney stones. A certain substance in increased concentration can cause kidney stones formation. Name this substance:
Correct answer	Uric acid
B	Cholesterol
C	Bilirubin
D	Urea
E	Cystine

№	krok 2015, 2012
Topic	Mechanism of hormonal action. Thyroid and parathyroid glands hormones
Task	Emotional stress causes activation of hormon-sensitive triglyceride lipase in the adipocytes. What secondary mediator takes part in this process?
Correct answer	Cyclic adenosine monophosphate
B	Cyclic guanosine monophosphate
C	Adenosine monophosphate
D	Diacylglycerol
E	Ions of $Ca^{2+}$
№	krok 2015
Topic	Specific ways of amino acids metabolism
Task	A patient has been diagnosed with alkaptonuria. Choose an enzyme that can cause this pathology when deficient:
Correct answer	Homogentisic acid oxidase
B	Phenylalanine hydroxylase
C	Glutamate dehydrogenase
D	Pyruvate dehydrogenase
E	Dioxyphenylalanine decarboxylase
№	krok 2015, 2014
Topic	Characteristics of the hemostasis system and immune processes
Task	A patient is diagnosed with hereditary coagulopathy that is characterised by factor VIII deficiency. Specify the phase of blood clotting during which coagulation will be disrupted in the given case:
Correct answer	Thromboplastin formation
B	Thrombin formation
C	Fibrin formation
D	Clot retraction
E	-
№	krok 2015
Topic	Nutrition biochemistry and vitamins fundamental
Task	During regular check-up a child is detected with interrupted mineralization of the bones. What vitamin deficiency can be the cause?
Correct answer	Calciferol
B	Riboflavin

C	Tocopherol
D	Folic acid
E	Cobalamin
№	krok 2015
Topic	Mechanisms of urine formation.Pathological components in urine
Task	According to the results of glucose tolerance test a patient has no disorder of carbohydrate tolerance. Despite that glucose is detected in the patients's urine (5 mmol/l). The patient has been diagnosed with renal diabetes. What renal changes cause glucosuria in this case?
Correct answer	Decreased activity of glucose reabsorption enzymes
B	Increased activity of glucose reabsorption enzymes
C	Exceeded glucose reabsorption threshold
D	Increased glucose secretion
E	Increased glucose filtration
№	krok 2015, 2014
Topic	Specific ways of amino acids metabolism
Task	In case of alkaptonuria, homogentisic acid is excreted in urine in large amounts. The development of this disease is associated with metabolic disorder of the followi-ng amino acid:
Correct answer	Tyrosine
B	Phenylalanine
C	Alanine
D	Methionine
E	Asparagine
№	krok 2015
Topic	Catabolism of carbohydrates
Task	Diseases of respiratory system and circulatory disorders impair the transport of oxygen, thus causing hypoxia. Under these conditions the energy metabolism is carried out by anaerobic glycolysis. As a result, the following substance is generated and accumulated in blood:
Correct answer	Lactic acid
B	Pyruvic acid
C	Glutamic acid
D	Citric acid
E	Fumaric acid

№	krok 2015
Topic	Characteristics and intracellular lipid metabolism
Task	One of the factors that cause obesity is inhibition of fatty acids oxidation due to:
Correct answer	Low level of carnitine
B	Impaired phospholipid synthesis
C	Excessive consumption of fatty foods
D	Choline deficiency
E	Lack of carbohydrates in the diet
№	krok 2015
Topic	Nucleic acid metabolism. Protein synthesis
Task	During cell division DNA replication occurs after a signal is received from the cytoplasm, then a certain portion of the DNA helix unwinds and splits into two individual strains. What enzyme facilitates this process?
Correct answer	Helicase
B	RNA polymerase
C	Ligase
D	Restrictase
E	DNA polymerase
№	krok 2015
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient, who has been suffering for a long time from intestine disbacteriosis, has increased hemorrhaging caused by disruption of posttranslational modification of blood-coagulation factors II, VII, IX, and X in the liver. What vitamin deficiency is the cause of this condition?
Correct answer	K
B	12
C	9
D	C
E	P
№	krok 2015
Topic	Characteristics and intracellular lipid metabolism
Task	Obesity is a common disease. The aim of its treatment is to lower content of neutral fats in the body. What hormon-sensitive enzyme is the most important for intracellular lipolysis?
Correct answer	Triacylglycerol lipase

B	Protein kinase
C	Adenylate kinase
D	Diacylglycerol lipase
E	Monoacylglycerol lipase
№	krok 2015
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient is diagnosed with chronic atrophic gastritis attended by deficiency of Castle's intrinsic factor. What type of anemia does the patient have?
Correct answer	$B_{12}$ -deficiency anemia
B	Iron refractory anemia
C	Hemolytic anemia
D	Iron-deficiency anemia
E	Protein-deficiency anemia
№	krok 2015
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A patient is diagnosed with cardiac infarction. Blood test for cardiospecific enzymes activity was performed. Which of the enzymes has three isoforms?
Correct answer	Creatine kinase
B	Lactate dehydrogenase
C	Aspartate transaminase
D	Alanine transaminase
E	Pyruvate kinase
№	krok 2015
Topic	The mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	Biochemical analysis of an infant's erythrocytes revealed evident glutathione peroxidase deficiency and low concentration of reduced glutathione. What pathological condition can develop in this infant?
Correct answer	Hemolytic anemia
B	Pernicious anemia
C	Megaloblastic anemia
D	Sickleemia
E	krok 2014

№	Nutrition biochemistry and vitamins fundamental
Topic	Malaria is treated with structural analogs of vitamin $B_2$ (riboflavin). These drugs disrupt the synthesis of the following enzymes in plasmodium:
Task	FAD-dependent dehydrogenase
Correct answer	Cytochrome oxidase
B	Peptidase
C	NAD-dependent dehydrogenase
D	Aminotransferase
E	
№	krok 2014
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 53-year-old male patient is diagnosed with Paget's disease. The concentration of oxyproline in daily urine is sharply increased, which primarily means intensified disintegration of:
Correct answer	Collagen
B	Keratin
C	Albumin
D	Hemoglobin
E	Fibrinogen
№	krok 2014
Topic	The mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	Cyanide is a poison that causes instant death of the organism. What enzymes found in mitochondria are affected by cyanide?
Correct answer	Cytochrome oxidase (aa3)
B	Flavin enzymes
C	Cytochrome $\epsilon$
D	NAD <sup>+</sup> -dependent dehydrogenase
E	Cytochrome P-450
№	krok 2014
Topic	Nucleotide metabolism
Task	A 46-year-old female patient consulted a doctor about pain in the small joints of the upper and lower limbs. The joints are enlarged and shaped like thickened nodes. Serum test revealed an increase in urate concentration. This might be caused by a disorder in metabolism of:



Correct answer	Purines
B	Carbohydrates
C	Lipids
D	Pyrimidines
E	Amino acids
№	krok 2014
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A biochemical urine analysis has been performed for a patient with progressive muscular dystrophy. In the given case muscle disease can be confirmed by the high content of the following substance in urine:
Correct answer	Creatine
B	Porphyrin
C	Urea
D	Hippuric acid
E	Creatinine
№	krok 2014
Topic	Catabolism of carbohydrates
Task	Human red blood cells do not contain mitochondria. What is the main pathway for ATP production in these cells?
Correct answer	Anaerobic glycolysis
B	Aerobic glycolysis
C	Oxidative phosphorylation
D	Creatine kinase reaction
E	Cyclase reaction
№	krok 2014
Topic	The mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	Those organisms which in the process of evolution failed to develop protection from $H_2O_2$ can exist only in anaerobic conditions. Which of the following enzymes can break hydrogen peroxide down?
Correct answer	Peroxidase and catalase
B	Oxygenase and hydroxylase
C	Cytochrome oxidase, cytochrome B5
D	Oxygenase and catalase
E	Flavin-dependent oxidase

№	krok 2014
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient has a critical impairment of protein, fat and hydrocarbon digestion. Most likely it has been caused by low secretion of the following digestive juice:
Correct answer	Pancreatic juice
B	Saliva
C	Gastric juice
D	Bile
E	Intestinal juice
№	krok 2014
Topic	Anabolism of carbohydrates
Task	Prolonged fasting causes hypoglycemia which is amplified by alcohol consumption, as the following process is inhibited:
Correct answer	Gluconeogenesis
B	Glycolysis
C	Glycogenolysis
D	Lipolysis
E	Proteolysis
№	krok 2014
Topic	Cholesterol metabolism. Ketone bodies
Task	A 39-year-old female patient with a history of diabetes was hospitalized in a precomatose state for diabetic ketoacidosis. This condition had been caused by an increase in the following metabolite level:
Correct answer	Acetoacetate
B	Citrate
C	Alpha-ketoglutarate
D	Malonate
E	Aspartate
№	krok 2014
Topic	Transamination and ammonia conversion
Task	A patient with hereditary hyperammonemia due to a disorder of ornithine cycle has developed secondary orotaciduria. The increased synthesis of orotic acid is caused by an increase in the following metabolite of ornithine cycle:
Correct answer	Carbamoyl phosphate
B	Citrulline

C	Ornithine
D	Urea
E	Argininosuccinate
№	krok 2014
Topic	Characteristics of the hemostasis system and immune processes
Task	A 49-year-old male patient with acute pancreatitis was likely to develop pancreatic necrosis, while active pancreatic proteases were absorbed into the blood stream and tissue proteins broke up. What protective factors of the body can inhibit these processes?
Correct answer	$\alpha_2$ -macroglobulin, $\alpha_1$ -antitrypsin
B	Immunoglobulin
C	Cryoglobulin, interferon
D	Ceruloplasmin, transferrin
E	Hemopexin, haptoglobin
№	krok 2014
Topic	Mechanisms of urine formation. Pathological components in urine
Task	According to the results of glucose tolerance test, the patient has no disorder of carbohydrate tolerance. Despite that, glucose is detected in the patients's urine (5 mmol/l). The patient has been diagnosed with renal diabetes. What renal changes cause glucosuria in this case?
Correct answer	Decreased activity of glucose reabsorption enzymes
B	Increased activity of glucose reabsorption enzymes
C	Exceeded glucose reabsorption threshold
D	Increased glucose secretion
E	Increased glucose filtration
№	krok 2014
Topic	Mechanisms of gas metabolism
Task	Patients with erythropoietic porphyria (Gunther's disease) have teeth that fluoresce with bright red color when subjected to ultraviolet radiation; their skin is light-sensitive, urine is red-colored. What enzyme can cause this disease, when it is deficient?
Correct answer	Uroporphyrinogen III cosynthase
B	Uroporphyrinogen I synthase
C	Delta-aminolevulinate synthase
D	Uroporphyrinogen decarboxylase
E	Ferrochelatase

№	krok 2014
Topic	Hormonal regulation of metabolism
Task	Examination of a 56-year-old female patient with a history of type 1 diabetes revealed a disorder of protein metabolism that is manifested by aminoacidemia in the laboratory blood test values, and clinically by the delayed wound healing and decreased synthesis of antibodies. Which of the following mechanisms causes the development of aminoacidemia?
Correct answer	Increased proteolysis
B	Albuminosis
C	Decrease in the concentration of amino acids in blood
D	Increase in the oncotic pressure in the blood plasma
E	Increase in low-density lipoprotein level
№	krok 2014
Topic	Nutrition biochemistry and vitamins fundamental
Task	Symptoms of pellagra (vitamin PP deficiency) is particularly pronounced in patients with low protein diet, because nicotinamide precursor in humans is one of the essential amino acids, namely:
Correct answer	Tryptophan
B	Threonine
C	Arginine
D	Histidine
E	Lysine
№	krok 2014
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	For biochemical diagnostics of myocardial infarction it is necessary to measure activity of a number of enzymes and their isoenzymes. What enzymatic test is considered to be the best to prove or disprove the diagnosis of infarction in the early period after the chest pain is detected?
Correct answer	Creatine kinase isoenzyme CK-MB
B	Creatine kinase isoenzyme CK-MM
C	LDH1 lactate dehydrogenase isoenzyme
D	LDH2 lactate dehydrogenase isoenzyme
E	Aspartate aminotransferase cytoplasmic isoenzyme
№	krok 2014
Topic	Nucleic acid metabolism. Protein synthesis

Task	During cell division, DNA replication occurs by a signal from the cytoplasm, and a certain portion of the DNA helix unwinds and splits into two individual strains. What enzyme facilitates this process?
Correct answer	Helicase
B	RNA polymerase
C	Ligase
D	Restrictase
E	DNA polymerase
№	krok 2014
Topic	Characteristics of the hemostasis system and immune processes
Task	A newborn baby has numerous hemorrhages. Blood coagulation tests reveal increased prothrombin time. The child is most likely to have a disorder of the following biochemical process:
Correct answer	Production of gamma-carboxyglutamate
B	Conversion of homocysteine to methionine
C	Conversion of methylmalonyl CoA to succinyl CoA
D	Degradation of glutathione
E	Hydroxylation of proline
№	krok 2014
Topic	Nucleic acid metabolism. Protein synthesis
Task	Hepatitis B is diagnosed through laboratory tests that determine the presence of HBA-DNA in blood serum of the patient. What reference method is applied for this purpose?
Correct answer	Polymerase chain reaction
B	Hybridization method
C	Hybridization signal amplification method
D	Ligase chain reaction method
E	ELISA diagnostic method
№	krok 2014
Topic	Nucleic acid metabolism. Protein synthesis
Task	Nucleolar organizers of the 13-15, 21, 22 human chromosomes contain about 200 cluster genes that synthesize RNA. These regions of chromosomes bear the information on the following type of RNA:
Correct answer	rRNA
B	tRNA
C	mRNA

D	snRNA
E	tRNA + rRNA
№	krok 2014
Topic	Nutrition biochemistry and vitamins fundamental
Task	Steatosis is caused by the accumulation of triacylglycerols in hepatocytes. One of the mechanisms of this disease development is a decrease in the utilization of VLDL neutral fat. What lipotropics prevent the development of steatosis?
Correct answer	Methionine, $B_6$ , $B_{12}$
B	Arginine, $B_2$ , $B_3$
C	Alanine, $B_1$ , $P P$
D	Valine, $B_3$ , $B_2$
E	Isoleucine, $B_1$ , $B_2$
№	krok 2014
Topic	Specific ways of amino acids metabolism
Task	Decarboxylation of glutamate induces production of gammaaminobutyric acid (GABA ) neurotransmitter. After breakdown, GABA is converted into a metabolite of the citric acid cycle, that is:
Correct answer	Succinate
B	Citric acid
C	Malate
D	Fumarate
E	Oxaloacetate
№	krok 2014
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 36-year-old female patient has a history of $B_2$ -hypovitaminosis. The most likely cause of specific symptoms (epithelial, mucosal, cutaneous, corneal lesions) is the deficiency of:
Correct answer	Flavin coenzymes
B	Cytochrome A1
C	Cytochrome oxidase
D	Cytochrome B
E	Cytochrome C
№	krok 2014
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues

Task	Disruption of nerve fiber myelinogenesis causes neurological disorders and mental retardation. These symptoms are typical for hereditary and acquired alterations in the metabolism of:
Correct answer	Sphingolipids
B	Neutral fats
C	Higher fatty acids
D	Cholesterol
E	Phosphatidic acid
№	krok 2014
Topic	Anabolism of carbohydrates
Task	A child has a history of hepatomegaly, hypoglycemia, seizures, especially on an empty stomach and in stressful situations. The child is diagnosed with Gierke disease. This disease is caused by the genetic defect of the following enzyme:
Correct answer	Glucose-6-phosphatase
B	Amyloid-1,6-glycosidase
C	Phosphoglucomutase
D	Glycogen phosphorylase
E	Glucokinase
№	krok 2014
Topic	Nucleic acid metabolism. Protein synthesis
Task	In cancer patients who have been continuously receiving methotrexate, the target cells of tumor with time become insensitive to this drug. In this case, gene amplification of the following enzyme is observed:
Correct answer	Dihydrofolate reductase
B	Thiaminase
C	Deaminase
D	Thioredoxin reductase
E	–
№	krok 2014
Topic	Anabolism of carbohydrates
Task	Pancreas is known as a mixed gland. Endocrine functions include production of insulin by beta cells. This hormone affects the metabolism of carbohydrates. What is its effect upon the activity of glycogen phosphorylase (GP) and glycogen synthase (GS)?
Correct answer	It inhibits GP and activates GS
B	It activates both GP and GS
C	It inhibits both GP and GS

D	It activates GP and inhibits GS
E	It does not affect the activity of GP and GS
№	krok 2013
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient diagnosed with focal tuberculosis of the upper lobe of the right lung had been taking isoniazid as a part of combination therapy. After some time, the patient reported of muscle weakness, decreased skin sensitivity, blurred vision, impaired motor coordination. Which vitamin preparation should be used to address these phenomena?
Correct answer	Vitamin B <sub>6</sub>
B	Vitamin A
C	Vitamin D
D	Vitamin B <sub>12</sub>
E	Vitamin C
№	krok 2013
Topic	Anabolism of carbohydrates
Task	A 60-year-old male patient has a 9-year history of diabetes and takes insulin Semilente for the correction of hyperglycemia. days ago he began taking anaprilin for hypertension. One hour after administration of the antihypertensive drug the patient developed hypoglycemic coma. What is the mechanism of hypoglycemia in case of anaprilin use?
Correct answer	Inhibition of glycogenolysis
B	Reduction of glucagon half-life
C	Increase of insulin Semilente half-life
D	Increase of bioavailability of insulin Semilente
E	Decrease in glucose absorption
№	krok 2013
Topic	Nucleic acid metabolism. Protein synthesis
Task	Pterin derivatives (aminopterin and methotrexate) are the inhibitors of dihydrofolate reductase, so that they inhibit the regeneration of tetrahydrofolic acid from dihydrofolate. These drugs inhibit the intermolecular transfer of monocarbon groups, thus suppressing the synthesis of the following polymer:
Correct answer	DNA
B	Protein
C	Homopolysaccharides
D	Gangliosides



E	Glycosaminoglycans
№	krok 2013
Topic	Hormonal regulation of metabolism
Task	A 60-year-old patient with a long history of stenocardia takes coronarodilator agents. He has also been administered acetylsalicylic acid to reduce platelet aggregation. What is the mechanism of antiplatelet action of acetylsalicylic acid?
Correct answer	It reduces the activity of cyclooxygenase
B	It reduces the activity of phosphodiesterase
C	It enhances the activity of platelet adenylate cyclase
D	It enhances the synthesis of prostacyclin
E	It has membrane stabilizing effect
№	krok 2013
Topic	Nucleotide metabolism
Task	A 42-year-old male patient with gout has an increased blood uric acid concentration. In order to reduce the level of uric acid the doctor administered him allopurinol. Allopurinol is the competitive inhibitor of the following enzyme:
Correct answer	Xanthine oxidase
B	Adenosine deaminase
C	Adenine phosphoribosyltransferase
D	Hypoxanthinephosphoribosyltransferase
E	Guanine deaminase
№	krok 2013
Topic	Anabolism of carbohydrates
Task	Glycogen polysaccharide is synthesized from the active form of glucose. The immediate donor of glucose residues during the glycogenesis is:
Correct answer	UDP-glucose
B	Glucose-1-phosphate
C	ADP-glucose
D	Glucose-6-phosphate
E	Glucose-3-phosphate
№	krok 2013
Topic	Nutrition biochemistry and vitamins fundamental
Task	A number of diseases can be diagnosed by evaluating activity of blood transaminases. What vitamin is one of cofactors of these enzymes?

Correct answer	B <sub>6</sub>
B	B <sub>2</sub>
C	B <sub>1</sub>
D	B <sub>8</sub>
E	B <sub>5</sub>
№	krok 2013
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient has normally coloured stool including a large amount of free fatty acids. The reason for this is a disturbance of the following process:
Correct answer	Fat absorption
B	Fat hydrolysis
C	Biliary excretion
D	Choleresis
E	Lipase secretion
№	krok 2013
Topic	Specific ways of amino acids metabolism
Task	By the decarboxylation of glutamate in the CNS an inhibitory mediator is formed. Name it:
Correct answer	GABA
B	Glutathione
C	Histamine
D	Serotonin
E	Asparagine
№	krok 2013
Topic	Nutrition biochemistry and vitamins fundamental
Task	A hospital has admitted a patient complaining of abdominal bloating, diarrhea, flatulence after eating protein foods. These signs are indicative of the impaired digestion of proteins and their increased degradation. Which of the following compounds is the product of this process?
Correct answer	Indole
B	Bilirubin
C	Cadaverine
D	Agmatine

E	Putrescine
№	krok 2013
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 20-year-old male patient complains of general weakness, rapid fatigability, irritability, decreased performance, bleeding gums, petechiae on the skin. What vitamin deficiency may be a cause of these changes?
Correct answer	Ascorbic acid
B	Riboflavin
C	Thiamine
D	Retinol
E	Folic acid
№	krok 2013
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	It is known that the monoamine oxidase (MAO) enzyme plays an important part in the metabolism of catecholamine neurotransmitters. In what way does the enzyme inactivate these neurotransmitters (norepinephrine, epinephrine, dopamine)?
Correct answer	Oxidative deamination
B	Addition of an amino group
C	Removal of a methyl group
D	Carboxylation
E	Hydrolysis
№	krok 2013
Topic	Functional and clinical biochemistry of liver
Task	Enzymatic jaundices are accompanied by abnormal activity of UDP-glucuronyl transferase. What compound is accumulated in blood serum in case of these pathologies?
Correct answer	Unconjugated bilirubin
B	Conjugated bilirubin
C	Dehydrobilirubin
D	Hydrobilirubin
E	Choleglobin
№	krok 2013
Topic	Nucleic acid metabolism. Protein synthesis
Task	Infectious diseases are treated with antibiotics (streptomycin, erythromycin, chloramphenicol). They inhibit the following stage of protein synthesis:

Correct answer	Translation
B	Transcription
C	Replication
D	Processing
E	Splicing
№	krok 2013
Topic	Catabolism of carbohydrates
Task	Diseases of the respiratory system and circulatory disorders impair the transport of oxygen, thus leading to hypoxia. Under these conditions the energy metabolism is carried out by anaerobic glycolysis. As a result, the following substance is generated and accumulated in blood:
Correct answer	Lactic acid
B	Pyruvic acid
C	Glutamic acid
D	Citric acid
E	Fumaric acid
№	krok 2013
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	6 hours after the myocardial infarction a patient was found to have elevated level of lactate dehydrogenase in blood. What isoenzyme should be expected in this case?
Correct answer	<i>LDH</i> <sub>1</sub>
B	<i>LDH</i> <sub>2</sub>
C	<i>LDH</i> <sub>3</sub>
D	<i>LDH</i> <sub>4</sub>
E	<i>LDH</i> <sub>5</sub>
№	krok 2013
Topic	Anabolism of carbohydrates
Task	The genetic defect of pyruvate carboxylase deficiency is the cause of delayed physical and mental development and early death in children. This defect is characterized by lacticemia, lactaciduria, disorder of a number of metabolic pathways. In particular, the following process is inhibited:
Correct answer	Citric acid cycle and gluconeogenesis
B	Glycolysis and glycogenolysis

C	Glycogenesis and glycogenolysis
D	Lipolysis and lipogenesis
E	Pentose phosphate pathway and glycolysis
№	krok 2013
Topic	Hormonal regulation of metabolism
Task	Deficiency of linoleic and linolenic acids in the body leads to the skin damage, hair loss, delayed wound healing, thrombocytopenia, low resistance to infections. These changes are most likely to be caused by the impaired synthesis of the following substances:
Correct answer	Eicosanoids
B	Interleukins
C	Interferons
D	Catecholamines
E	Corticosteroids
№	krok 2013
Topic	Nucleic acid metabolism. Protein synthesis
Task	An experiment proved that UV-irradiated skin cells of patients with xeroderma pigmentosum restore the native structure of DNA slower than the cells of healthy people due to the defect in repair enzyme. What enzyme takes part in this process?
Correct answer	Endonuclease
B	RNA ligase
C	Primase
D	DNA polymerase
E	DNA gyrase
№	krok 2013
Topic	Nucleotide metabolism
Task	Children with Lesch-Nyhan syndrome have a severe form of hyperuricemia accompanied by the formation of tophi, urate calculi in the urinary tracts, as well as serious neuro-psychiatric disorders. The cause of this disease is the reduced activity of the following enzyme:
Correct answer	Hypoxanthineguanine phosphoribosyltransferase
B	Xanthine oxidase
C	Dihydrofolate reductase
D	Thymidylate synthase
E	Karbamoyl phosphate synthetase
№	krok 2013
Topic	Nutrition biochemistry and vitamins fundamental

Task	Due to the blockage of the common bile duct (which was radiographically confirmed), the biliary flow to the duodenum was stopped. We should expect the impairment of:
Correct answer	Fat emulsification
B	Protein absorption
C	Carbohydrate hydrolysis
D	Secretion of hydrochloric acid
E	Salivation inhibition
№	krok 2013
Topic	Nucleic acid metabolism. Protein synthesis
Task	At the stage of translation in the rough endoplasmic reticulum, the ribosome moves along the mRNA. Amino acids are joined together by peptide bonds in a specific sequence, and thus polypeptide synthesis takes place. The sequence of amino acids in a polypeptide corresponds to the sequence of:
Correct answer	mRNA codons
B	tRNA nucleotides
C	tRNA anticodons
D	rRNA nucleotides
E	rRNA anticodons
№	krok 2013
Topic	Blood fundamental
Task	A 12-year-old patient was found to have blood serum cholesterol at the rate of 25 mmol/l. The boy has a history of hereditary familial hypercholesterolemia, which is caused by the impaired synthesis of the following protein receptors:
Correct answer	Low density lipoproteins
B	High density lipoproteins
C	Chylomicrons
D	Very low density lipoproteins
E	Intermediate density lipoproteins
№	krok 2012, 2010
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Characteristic sign of glycogenosis is muscle pain during physical work. Blood examination reveals usually hypoglycemia. This pathology is caused by congenital deficiency of the following enzyme:
Correct answer	Glycogen phosphorylase
B	Glucose 6-phosphate dehydrogenase

C	Alpha amylase
D	Gamma amylase
E	Lysosomal glycosidas
№	krok 2012
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 30 year old woman has subnormal concentration of enzymes in the pancreatic juice. This might be caused by the hyposecretion of the following gastroi-ntestinal hormone:
Correct answer	Cholecystokininpancreozymin
B	Somatostatin
C	Secretin
D	Gastro-inhibiting peptide
E	Vaso-intestinal peptide
№	krok 2012, 2010
Topic	Nutrition biochemistry and vitamins fundamental
Task	An experimantal animal that was kept on protein-free diet developed fatty liver infiltration, in particular as a result of deficiency of methylating agents. This is caused by disturbed generation of the following metabolite:
Correct answer	Choline
B	DOPA
C	Cholesterol
D	Acetoacetate
E	Linoleic acid
№	krok 2012, 2009
Topic	Mechanisms of urine formation.Pathological components in urine
Task	A patient complains about dyspnea provoked by the physical activity. Clinical examination revealed anaemia and presence of the paraprotein in the zone of gamma-globulins. To confirm the myeloma diagnosis it is necessary to determine the following index in the patient's urine:
Correct answer	Bence Jones protein
B	Bilirubin
C	Haemoglobin
D	Ceruloplasmin
E	Antitrypsin
№	krok 2012

Topic	Specific ways of amino acids metabolism
Task	A 2 year old child with mental and physical retardation has been delivered to a hospital. He presents with frequent vomiting after having meals. There is phenylpyruvic acid in urine. Which metabolism abnormality is the reason for this pathology?
Correct answer	Amino-acid metabolism
B	Lipidic metabolism
C	Carbohydrate metabolism
D	Water-salt metabolism
E	Phosphoric calcium metabolism
№	krok 2012
Topic	Hormonal regulation of metabolism
Task	Before the cells can utilize the glucose, it is first transported from the extracellular space through the plasmatic membrane inside them. This process is stimulated by the following hormone:
Correct answer	Insulin
B	Glucagon
C	Thyroxin
D	Aldosterone
E	Adrenalin
№	krok 2012
Topic	Mechanism of hormonal action. Thyroid and parathyroid glands hormones
Task	Parodontitis is treated with calcium preparations and a hormone that stimulates tooth mineralization and inhibits tissue resorption. What hormone is it?
Correct answer	Calcitonin
B	Parathormone
C	Adrenalin
D	Aldosterone
E	Thyroxine
№	krok 2012
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 36 year old female patient has a history of collagen disease. Urine analysis is likely to reveal an increased concentration of the following metabolite:
Correct answer	Oxyproline
B	Indican



C	Creatinine
D	Urea
E	Urobilinogen
№	krok 2012, 2010
Topic	Nutrition biochemistry and vitamins fundamental
Task	Vitamin A together with specific cytoceptors penetrates through the nuclear membranes, induces transcription processes that stimulate growth and differentiation of cells. This biological function is realized by the following form of vitamin A:
Correct answer	Trans-retinoic acid
B	Trans-retinal
C	Cis-retinal
D	Retinol
E	Carotin
№	krok 2012
Topic	Nutrition biochemistry and vitamins fundamental
Task	To prevent postoperative bleeding a 6-year-old child was administered vicasol that is a synthetic analogue of vitamin K. Name posttranslational changes of blood coagulation factors that will be activated by vicasol:
Correct answer	Carboxylation of glutamin acid
B	Phosphorylation of serine radicals
C	Partial proteolysis
D	Polymerization
E	Glycosylation
№	krok 2012, 2011
Topic	Functional and clinical biochemistry of liver
Task	Blood analysis of a patient with jaundice reveals conjugated bilirubinemia, increased concentration of bile acids. There is no stercobilinogen in urine. What type of jaundice is it?
Correct answer	Obstructive jaundice
B	Hepatocellular jaundice
C	Parenchymatous jaundice
D	Hemolytic jaundice
E	Cythemolytic jaundice
№	krok 2012, 2011
Topic	Specific ways of amino acids metabolism

Task	A patient has been diagnosed with alkaptonuria. Choose an enzyme whose deficiency can be the reason for this pathology:
Correct answer	Homogentisic acid oxidase
B	Phenylalanine hydroxylase
C	Glutamate dehydrogenase
D	Pyruvate dehydrogenase
E	Dioxyphenylalanine decarboxylase
№	krok 2012
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 60 year old patient was found to have a dysfunction of main digestive enzyme of saliva. This causes the disturbance of primary hydrolysis of:
Correct answer	Carbohydrates
B	Fats
C	Proteins
D	Cellulose
E	Lactose
№	krok 2012
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Osteolaterism is characterized by a decrease in collagen strength caused by much less intensive formation of cross-links in collagen fibrils. This phenomenon is caused by the low activity of the following enzyme:
Correct answer	Lysyl oxidase
B	Monoamino-oxidase
C	Prolyl hydroxylase
D	Lysyl hydroxylase
E	Collagenase
№	krok 2012
Topic	Nucleic acid metabolism. Protein synthesis
Task	An oncological patient had been administered methotrexate. With time target cells of the tumour lost sensitivity to this drug. At the same time the change in gene expression of the following enzyme is observed:
Correct answer	Dehydrofolate reductase
B	Thiaminase
C	Deaminase
D	Pholate oxidase

E	Pholate decarboxylase
№	krok 2012, 2010
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 64 year old woman has impairment of twilight vision (hemeralopy). What vitamin should be recommended in the first place?
Correct answer	A
B	B <sub>2</sub>
C	E
D	C
E	B <sub>6</sub>
№	krok 2012
Topic	Nucleic acid metabolism. Protein synthesis
Task	Life cycle of a cell includes a process of DNA autoreplication. As a result of this process monochromatid chromosomes become bichromatid. This phenomenon is observed within the following period of the cell cycle:
Correct answer	S
B	G <sub>0</sub>
C	G <sub>1</sub>
D	G <sub>2</sub>
E	M
№	krok 2012
Topic	Specific and general paths of catabolism
Task	Examination of a patient revealed II grade obesity. It is known that he consumes a lot of sweets and rich food, has sedentary way of life. That's why anabolic metabolism has the priority in his organism. Which of the following pathways is amphibolic?
Correct answer	Cycle of tricarboxylic acids
B	Glyconeogenesis
C	Lipolysis
D	Glycolysis
E	Fatty acids oxidation
№	krok 2012
Topic	Functional and clinical biochemistry of liver
Task	An infectious disease unit admitted a patient with signs of jaundice caused by hepatitis virus. Select an indicator that is specific only for parenchymatous jaundice:

Correct answer	Increase in ALT and AST rate
B	Hyperbilirubinemia
C	Bilirubinuria
D	Cholaemia
E	Urobilinuria
№	krok 2012
Topic	Specific ways of amino acids metabolism
Task	A patient presents with dysfunction of cerebral cortex accompanied by epileptic seizures. He has been administered a biogenic amine synthesized from glutamate and responsible for central inhibition. What substance is it?
Correct answer	Gamma-amino butyric acid
B	Serotonin
C	Dopamine
D	Acetylcholine
E	Histamine
№	krok 2012, 2011
Topic	Specific ways of amino acids metabolism
Task	A male patient has been diagnosed with acute radiation disease. Laboratory examination revealed a considerable reduction of platelet serotonin level. The likely cause of platelet serotonin reduction is the disturbed metabolism of the following substance:
Correct answer	5-oxytryptofane
B	Tyrosine
C	Histidine
D	Phenylalanine
E	Serine
№	krok 2012
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Pharmacological effects of antidepressants are based upon blocking (inhibiting) the enzyme that acts as a catalyst for the breakdown of biogenic amines noradrenalin and serotonin in the mitochondria of cephalic neurons. What enzyme takes part in this process?
Correct answer	Monoamine oxidase
B	Transaminase
C	Decarboxylase
D	Peptidase
E	Lyase

№	krok 2011
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 46-year-old female patient has a continuous history of progressive muscular (Duchenne's) dystrophy. Which blood enzyme changes will be of diagnostic value in this case?
Correct answer	Creatine phosphokinase
B	Lactate dehydrogenase
C	Pyruvate dehydrogenase
D	Glutamate dehydrogenase
E	Adenylate cyclase
№	krok 2011
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 10-year-old girl has a history of repeated acute respiratory viral infection. After recovering she presents with multiple petechial hemorrhages on the sites of friction from clothing rubbing the skin. What kind of hypovitaminosis has this girl?
Correct answer	C
B	$B_6$
C	$B_1$
D	A
E	$B_2$
№	krok 2011, 2008
Topic	General characteristics of enzymes
Task	Researchers isolated 5 isoenzymic forms of lactate dehydrogenase from the human blood serum and studied their properties. What property indicates that the isoenzymic forms were isolated from the same enzyme?
Correct answer	Catalyzation of the same reaction
B	The same molecular weight
C	The same physicochemical properties
D	Tissue localization
E	The same electrophoretic mobility
№	krok 2011, 2009
Topic	Specific ways of amino acids metabolism
Task	A patient has pellagra. Interrogation revealed that he had lived mostly on maize for a long time and eaten little meat. This disease had been caused by the deficit of the following substance in the maize:

Correct answer	Tryptophan
B	Tyrosine
C	Proline
D	Alanine
E	Histidine
№	krok 2011
Topic	Nucleotide metabolism
Task	A 46-year-old patient consulted a doctor complaining about joint pain that becomes stronger the day before the weather changes. Blood examination revealed an increased concentration of uric acid. The most probable cause of the disease is the intensified disintegration of the following substance:
Correct answer	Adenosine monophosphate
B	Cytidine monophosphate
C	Uridine triphosphate
D	Uridine monophosphate
E	Thymidine monophosphate
№	krok 2011
Topic	Specific ways of amino acids metabolism
Task	A 2-year-old child with mental and physical retardation has been delivered to a hospital. He presents with frequent vomiting after having meals. There is phenylpyruvic acid in urine. Which metabolism abnormality is the reason for this pathology?
Correct answer	Aminoacid metabolism
B	Lipidic metabolism
C	Carbohydrate metabolism
D	Water-salt metabolism
E	Phosphoric calcium metabolism
№	krok 2011
Topic	Nutrition biochemistry and vitamins fundamental
Task	A doctor recommends a patient with duodenal ulcer to drink cabbage and potato juice after the therapy course. Which substances contained in these vegetables help to heal and prevent the ulcers?
Correct answer	Vitamin <i>U</i>
B	Pantothenic acid
C	Vitamin <i>C</i>

D	Vitamin $B_1$
E	Vitamin $K$
№	krok 2011
Topic	Specific ways of amino acids metabolism
Task	Urine analysis of a 12-year-old boy reveals high concentration of all aliphatic amino acids with the highest excretion of cystine and cysteine. US of kidneys revealed kidney concrements. What is the most likely pathology?
Correct answer	Cystinuria
B	Alkaptonuria
C	Cystitis
D	Phenylketonuria
E	Hartnup disease
№	krok 2011
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 30-year-old male patient with acute pancreatitis has been found to have a disorder of cavitory protein digestion. The reason for such condition can be the hyposynthesis and hyposecretion of the following enzyme:
Correct answer	Tripsin
B	Pepsin
C	Lipase
D	Dipeptidase
E	Amylase
№	krok 2011, 2009
Topic	Transamination and ammonia conversion
Task	The greater amount of nitrogen is excreted from the organism in form of urea. Inhibition of urea synthesis and accumulation of ammonia in blood and tissues are induced by the decreased activity of the following liver enzyme:
Correct answer	Carbamoyl phosphate synthetase
B	Aspartate aminotransferase
C	Urease
D	Amylase
E	Pepsin
№	krok 2011
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues

Task	A 36-year-old female patient has a history of collagen disease. Urine analysis is likely to reveal an increased concentration of the following metabolite:
Correct answer	Oxyproline
B	Indican
C	Creatinine
D	Urea
E	Urobilinogen
№	krok 2011
Topic	Nutrition biochemistry and vitamins fundamental
Task	A coprological survey revealed light-colored feces containing drops of neutral fat. The most likely reason for this condition is the disorder of:
Correct answer	Bile inflow into the bowel
B	Gastric juice acidity
C	Pancreatic juice secretion
D	Intestinal juice secretion
E	Intestinal absorption
№	krok 2011, 2008
Topic	Nucleic acid metabolism. Protein synthesis
Task	It was revealed that T-lymphocytes were affected by HIV. Virus enzyme - reverse transcriptase ( <i>RN A</i> -dependent <i>DN A</i> -polymerase) - catalyzes the synthesis of:
Correct answer	<i>DN A</i> on the matrix of virus <i>mRN A</i>
B	Virus informational <i>RN A</i> on the matrix of <i>DN A</i>
C	<i>DN A</i> on virus ribosomal <i>RN A</i>
D	Viral <i>DN A</i> on <i>DN A</i> matrix
E	<i>mRN A</i> on the matrix of virus protein
№	krok 2011
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient has an increased pyruvate concentration in blood, most of it is excreted with the urine. What kind of avitaminosis has this patient?
Correct answer	<i>B</i> <sub>1</sub>
B	<i>E</i>



C	$B_3$
D	$B_6$
E	$B_2$
№	krok 2011
Topic	Functional and clinical biochemistry of liver
Task	Jaundice treatment involves administration of barbiturates inducing the synthesis of UDP-glucuronyl transferase. A medicinal effect is caused by the production of:
Correct answer	Direct reacting (conjugated) bilirubin
B	Indirect reacting (unconjugated) bilirubin
C	Biliverdin
D	Protoporphyrin
E	Heme
№	krok 2011
Topic	Functional and clinical biochemistry of liver
Task	Blood analysis of a patient with jaundice reveals conjugated bilirubinemia, increased concentration of bile acids. There is no stercobilinogen in urine. What type of jaundice is it?
Correct answer	Obstructive jaundice
B	Hepatocellular jaundice
C	Parenchymatous jaundice
D	Hemolytic jaundice
E	Cythemolytic jaundice
№	krok 2011, 2009
Topic	Nutrition biochemistry and vitamins fundamental
Task	Vitamin $B_1$ deficiency causes disturbance of oxidative decarboxylation of $\alpha$ -ketoglutaric acid. This leads to the impaired synthesis of the following coenzyme:
Correct answer	Thiamine pyrophosphate
B	Nicotinamide adenine dinucleotide
C	Flavine adenine dinucleotide
D	Lipoic acid
E	Coenzyme A
№	krok 2011

Topic	Hormonal regulation of metabolism
Task	The patient with complaints of permanent thirst applied to the doctor. Hyperglycemia, polyuria and increased concentration of 17-ketosteroids in the urine were revealed. What disease is the most likely?
Correct answer	Steroid diabetes
B	Insulin-dependent diabetes mellitus
C	Myxoedema
D	Type I glycogenosis
E	Addison's disease
№	krok 2011
Topic	Hormonal regulation of metabolism
Task	A 32-year-old patient consulted a doctor about the absence of lactation after parturition. Such disorder might be explained by the deficit of the following hormone:
Correct answer	Prolactin
B	Somatotropin
C	Vasopressin
D	Thyrocalcitonin
E	Glucagon
№	krok 2011
Topic	Functional and clinical biochemistry of liver
Task	A patient presents with icteritiousness of skin, scleras and mucous membranes. Blood plasma the total bilirubin is increased, stercobilin is increased in feces, urobilin is increased in urine. What type of jaundice is it?
Correct answer	Haemolytic
B	Gilbert's disease
C	Parenchymatous
D	Obturation
E	Cholestatic
№	krok 2011
Topic	Blood fundamental
Task	Blood plasma of a healthy man contains several dozens of proteins. During an illness new proteins can originate, namely the protein of "acute phase". Select such protein from the listed below:
Correct answer	C-reactive protein
B	Prothrombin

C	Fibrinogen
D	G immunoglobulin
E	A immunoglobulin
№	krok 2011, 2010
Topic	Specific ways of amino acids metabolism
Task	During hypersensitivity test a patient got subcutaneous injection of an antigen which caused reddening of skin, edema, pain as a result of histamine action. This biogenic amine is generated as a result of transformation of the following histidine amino acid:
Correct answer	Decarboxylation
B	Methylation
C	Phosphorylation
D	Isomerization
E	Deamination
№	krok 2011, 2010
Topic	Specific ways of amino acids metabolism
Task	A patient complained about dizziness, memory impairment, periodical convulsions. It was revealed that these changes were caused by a product of decarboxylation of glutamic acid. Name this product:
Correct answer	GABA
B	Pyridoxal phosphate
C	TDP
D	ATP
E	THFA
№	krok 2011, 2008
Topic	Nucleic acid metabolism. Protein synthesis
Task	It was found out that some compounds, for instance fungi toxins and some antibiotics can inhibit activity of <i>RN A</i> -polymerase. What process will be disturbed in a cell in case of inhibition of this enzyme?
Correct answer	Transcription
B	Processing
C	Replication
D	Translation
E	Reparation
№	krok 2011, 2008
Topic	Nucleic acid metabolism. Protein synthesis

Task	Life cycle of a cell includes the process of DNA autoreduplication. As a result of it monochromatid chromosomes turn into bichromatid ones. What period of cell cycle does this phenomenon fall into?
Correct answer	<i>S</i>
B	<i>G<sub>0</sub></i>
C	<i>G<sub>1</sub></i>
D	<i>G<sub>2</sub></i>
E	<i>M</i>
№	krok 2011, 2008
Topic	Functional and clinical biochemistry of liver
Task	During starvation muscle proteins break up into free amino acids. These compounds will be the most probably involved into the following process:
Correct answer	Gluconeogenesis in liver
B	Gluconeogenesis in muscles
C	Synthesis of higher fatty acids
D	Glycogenolysis
E	Decarboxylation
№	krok 2011
Topic	Characteristics and intracellular lipid metabolism
Task	A 1-year-old baby has been hospitalised for body and limbs lesions. Examination revealed carnitine deficiency in the child's muscles. A biochemical reason for this pathology is the disorder of:
Correct answer	Transport of fatty acids to mitochondria
B	Regulation of $Ca^{2+}$ rate in mitochondria
C	Substrate-linked phosphorylation
D	Utilization of lactic acid
E	Oxidative phosphorylation
№	krok 2011
Topic	Catabolism of carbohydrates
Task	Some students developed myodynia after continuous physical activity during physical education. The reason for such condition was accumulation of lactic acid in the skeletal muscles. It was generated in the students' bodies after activation of the following process:
Correct answer	Glycolysis
B	Gluconeogenesis

C	Pentose-phosphate cycle
D	Lipolysis
E	Glycogeny
№	krok 2011
Topic	Nutrition biochemistry and vitamins fundamental
Task	A newborn develops dyspepsia after the milk feeding. When the milk is substituted by the glucose solution the dyspepsia symptoms disappear. The newborn has the subnormal activity of the following enzyme:
Correct answer	Lactase
B	Invertase
C	Maltase
D	Amylase
E	Isomaltase
№	krok 2011, 2009
Topic	Transamination and ammonia conversion
Task	A newborn child was found to have reduced intensity of sucking, frequent vomiting, hypotonia. Urine and blood exhibit increased concentration of citrulline. What metabolic process is disturbed?
Correct answer	Ornithinic cycle
B	Tricarboxylic acid cycle
C	Glycolysis
D	Glyconeogenesis
E	Cori cycle
№	krok 2011
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A child has mental and physical retardation, grave damage of internal connective tissue. Urine analysis reveals keratan sulfates. What metabolic process is disturbed?
Correct answer	Glycosaminoglycans
B	Collagen
C	Elastin
D	Fibronectin
E	Hyaluronic acid
№	krok 2011, 2010
Topic	The mechanism of tissue respiration. Peroxide and microsomal oxidation

Task	Study of conversion of a food colouring agent revealed that neutralization of this xenobiotic takes place only in one phase - microsomal oxydation. Name a component of this phase:
Correct answer	Cytochrome P-450
B	Cytochrome B
C	Cytochrome C
D	Cytochrome A
E	Cytochrome oxidase
№	krok 2009
Topic	Mechanisms of gas metabolism
Task	A mother consulted a doctor about her 5-year-old child who develops erythemas, vesicular rash and skin itch under the influence of sun. Laboratory studies revealed decreased iron concentration in the blood serum, increased uroporphyrinogen I excretion with the urine. What is the most likely inherited pathology in this child?
Correct answer	Erythropoietic porphyria
B	Methemoglobinemia
C	Hepatic porphyria
D	Coproporphyrin
E	Intermittent porphyria
№	krok 2009
Topic	Specific ways of amino acids metabolism
Task	A baby refuses the breast, he is anxious, presents with arrhythmic respiration. The urine smells of "brewer's yeast" or "maple syrup". This pathology was caused by the inherited defect of the following enzyme:
Correct answer	Dehydrogenase of branched-chain alpha-keto acids
B	Glucose 6-phosphate dehydrogenase
C	Glycerol kinase
D	Aspartate aminotransferase
E	UDP-glucuronil transferase
№	krok 2009
Topic	Nucleic acid metabolism. Protein synthesis
Task	A patient's organism has decreased concentration of magnesium ions that are necessary for attachment of ribosomes to the granular endoplasmatic reticulum. It is known that this causes protein biosynthesis disturbance. What stage of protein biosynthesis will be disturbed?
Correct answer	Translation

B	Transcription
C	Replication
D	Amino acid activation
E	Termination
№	krok 2009
Topic	Mechanisms of gas metabolism
Task	A 62-year-old female patient has developed a cataract (lenticular opacity) secondary to the diabetes mellitus. What type of protein modification is observed in case of diabetic cataract?
Correct answer	Glycosylation
B	Phosphorylation
C	ADP-ribosylation
D	Methylation
E	Limited proteolysis
№	krok 2009
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient has an increased pyruvate concentration in blood. A large amount of it is excreted with the urine. What vitamin is lacking in this patient?
Correct answer	<i>B</i> <sub>1</sub>
B	<i>E</i>
C	<i>B</i> <sub>3</sub>
D	<i>B</i> <sub>6</sub>
E	<i>B</i> <sub>2</sub>
№	krok 2009
Topic	Characteristics and intracellular lipid metabolism
Task	A patient with high rate of obesity was advised to use carnitine as a food additive in order to enhance "fat burning". What is the role of carnitine in the process of fat oxidation?
Correct answer	Transport of FFA (free fatty acids) from cytosol to the mitochondria
B	Transport of FFA from fat depots to the tissues
C	It takes part in one of reactions of FFA beta-oxidation
D	FFA activation
E	Activation of intracellular lipolysis

№	krok 2009
Topic	Specific ways of amino acids metabolism
Task	Nappies of a newborn have dark spots being the evidence of homogentisic acid formation. This is caused by the metabolic disorder of the following substance:
Correct answer	Tyrosine
B	Galactose
C	Methionine
D	Cholesterol
E	Tryptophan
№	krok 2009
Topic	Hormonal regulation of metabolism
Task	To prevent the transplant rejection after organ transplantation it is required to administer hormonotherapy for the purpose of immunosuppression. What hormones are used for this purpose?
Correct answer	Glucocorticoids
B	Mineralocorticoids
C	Sexual hormones
D	Catecholamines
E	Thyroid
№	krok 2009
Topic	Specific ways of amino acids metabolism
Task	A 1,5-year-old child presents with both mental and physical lag, decolorizing of skin and hair, decrease in catecholamine concentration in blood. When a few drops of 5% solution of trichloroacetic iron had been added to the child's urine it turned olive green. Such alteration are typical for the following pathology of the amino acid metabolism:
Correct answer	Phenylketonuria
B	Alkaptonuria
C	Tyrosinosis
D	Albinism
E	Xanthinuria
№	krok 2009
Topic	Nutrition biochemistry and vitamins fundamental
Task	Examination of a patient with frequent haemorrhages from the internal organs and mucous membranes revealed proline and lysine within the collagen Fibers. Disorder of their hydroxylation is caused by lack of the following vitamin:



Correct answer	Vitamin <i>C</i>
B	Vitamin <i>K</i>
C	Vitamin <i>A</i>
D	Vitamin <i>B</i> <sub>1</sub>
E	Vitamin <i>E</i>
№	krok 2009
Topic	Mechanism of hormonal action. Thyroid and parathyroid glands hormones
Task	Products of some proteins hydrolysis and modification are the biologically active substances called hormones. Lipotropin, corticotropin, melanotropin and endorphins are synthesized in the hypophysis of the following protein:
Correct answer	Proopiomelanocortin (POMC)
B	Neuroalbumin
C	Neurostromin
D	Neuroglobulin
E	Thyreoglobulin
№	krok 2009
Topic	Nutrition biochemistry and vitamins fundamental
Task	In patients with the biliary tract obstruction the blood coagulation is inhibited; the patients have frequent haemorrhages caused by the subnormal assimilation of the following vitamin:
Correct answer	<i>K</i>
B	<i>A</i>
C	<i>D</i>
D	<i>E</i>
E	<i>C</i>
№	krok 2009
Topic	Hormonal regulation of metabolism
Task	A patient with android-type obesity had been suffering from arterial hypertension, hyperglycemia, glycosuria for a long time and died from the cerebral haemorrhage. Pathologic examination revealed pituitary basophil adenoma, adrenal cortex hyperplasia. What is the most likely diagnosis?
Correct answer	Itsenko-Cushing's syndrome
B	Diabetes mellitus
C	Acromegalia

D	Pituitary nanism
E	Adiposogenital dystrophy
№	krok 2009
Topic	Nutrition biochemistry and vitamins fundamental
Task	During examination of an 11-month-old infant a pediatrician revealed osteoectasia of the lower extremities and delayed mineralization of cranial bones. Such pathology is usually provoked by the deFIcIt of the following vitamin:
Correct answer	Cholecalciferol
B	Thiamin
C	Pantothenic acid
D	Bioβavonoids
E	Riboβavin
№	krok 2009
Topic	Nutrition biochemistry and vitamins fundamental
Task	Examination of a patient suffering from chronic hepatitis revealed a significant decrease in the synthesis and secretion of bile acids. What process will be mainly disturbed in the patient's bowels?
Correct answer	Fat emulsification
B	Protein digestion
C	Carbohydrate digestion
D	Glycerin absorption
E	Amino acid absorption
№	krok 2009
Topic	Nucleic acid metabolism. Protein synthesis
Task	You are studying functioning of a bacteria operon. The operator gene has been released from the repressor gene. Immediately after this the following process will start in the cell:
Correct answer	Transcription
B	Translation
C	Replication
D	Processing
E	Repression
№	krok 2009
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	After a sprint an untrained person develops muscle hypoxia. This leads to the accumulation of the following metabolite in muscles:

Correct answer	Lactate
B	Ketone bodies
C	Acetyl CoA
D	Glucose 6-phosphate
E	Oxaloacetate
№	krok 2009
Topic	Catabolism of carbohydrates
Task	Cytoplasm of the myocytes contains a lot of dissolved metabolites resulting from glucose oxidation. Name the metabolite that turns directly into lactate:
Correct answer	Pyruvate
B	Oxaloacetate
C	Glycerophosphate
D	Glucose-6-phosphate
E	Fructose-6-phosphate
№	krok 2009
Topic	Transamination and ammonia conversion
Task	On the ground of clinical presentations a patient was prescribed pyridoxal phosphate. This medication is recommended for correction of the following processes:
Correct answer	Transamination and decarboxylation of amino acids
B	Oxidative decarboxylation of ketonic acids
C	Desamination of purine nucleotides
D	Synthesis of purine and pyrimidin bases
E	Protein synthesis
№	krok 2009
Topic	Hormonal regulation of metabolism
Task	A 32-year-old patient consulted a doctor about the absence of lactation after parturition. Such disorder might be explained by the deficit of the following hormone:
Correct answer	Prolactin
B	Somatotropin
C	Vasopressin
D	Thyrocalcitonin
E	Glucagon

№	krok 2009
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Depressions and emotional insanities result from the deficit of noradrenalin, serotonin and other biogenic amines in the brain. Their concentration in the synapses can be increased by means of the antidepressants that inhibit the following enzyme:
Correct answer	Monoamine oxidase
B	Diamine oxidase
C	L-amino-acid oxidase
D	D-amino-acid oxidase
E	Phenylalanine-4-monooxygenase
№	krok 2009
Topic	Functional and clinical biochemistry of liver
Task	A patient presents with icteritiousness of skin, scleras and mucous membranes. Blood plasma the total bilirubin is increased, stercobilin is increased in feces, urobilin is increased in urine. What type of jaundice is it?
Correct answer	Haemolytic
B	Gilbert's disease
C	Parenchymatous
D	Obturatorial
E	Cholestatic
№	krok 2009
Topic	Specific ways of amino acids metabolism
Task	A 9-month-old infant is fed with artificial formulas with unbalanced vitamin $B_6$ concentration. The infant presents with pellagral dermatitis, convulsions, anaemia. Convulsion development might be caused by the disturbed formation of:
Correct answer	GABA
B	Histamine
C	Serotonin
D	DOPA
E	Dopamine
№	krok 2009
Topic	Functional and clinical biochemistry of liver
Task	After a disease a 16-year-old boy is presenting with decreased function of protein synthesis in the liver as a result of vitamin $K$ deficiency. This may cause disorder of:

Correct answer	Blood coagulation
B	Erythrocyte sedimentation rate
C	Anticoagulant production
D	Erythropoietin production
E	Osmotic blood pressure
№	krok 2009
Topic	Nucleic acid metabolism. Protein synthesis
Task	Life cycle of a cell includes a process of DNA autoreduplication. As a result of this process monochromatid chromosomes become bichromatid. This phenomenon is observed within the following period of the cell cycle:
Correct answer	<i>S</i>
B	<i>G</i> <sub>0</sub>
C	<i>G</i> <sub>1</sub>
D	<i>G</i> <sub>2</sub>
E	<i>M</i>
№	krok 2009
Topic	Characteristics of the hemostasis system and immune processes
Task	A patient suffers from the haemorrhagic syndrome that shows itself in frequent nasal bleedings, posttraumatic and spontaneous intracutaneous and intraarticular haemorrhages. After a laboratory study a patient was diagnosed with the type B haemophilia. This disease is provoked by the deFIcit of the following factor of blood coagulation:
Correct answer	IX
B	VIII
C	XI
D	V
E	VII
№	krok 2009
Topic	
Task	A 58-year-old patient suffers from the cerebral atherosclerosis. Examination revealed hyperlipoidemia. What class of lipoproteins will most probably show increase in concentration in this patient's blood serum?
Correct answer	Low-density lipoproteins
B	High-density lipoproteins
C	Fatty acid complexes with albumins

D	Chylomicrons
E	
№	krok 2009
Topic	Nutrition biochemistry and vitamins fundamental
Task	A newborn develops dyspepsia after the milk feeding. When the milk is substituted by the glucose solution the dyspepsia symptoms disappear. The newborn has the subnormal activity of the following enzyme:
Correct answer	Lactase
B	Invertase
C	Maltase
D	Amylase
E	Isomaltase
№	krok 2009
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Pharmacological effects of antidepressants are based upon blocking (inhibiting) the enzyme that acts as a catalyst for the breakdown of biogenic amines noradrenalin and serotonin in the mitochondria of cephalic neurons. What enzyme takes part in this process?
Correct answer	Monoamine oxidase
B	Transaminase
C	Decarboxylase
D	Peptidase
E	Lyase
№	krok 2009
Topic	Nucleic acid metabolism. Protein synthesis
Task	An oncological patient was administered methotrexate. With the lapse of time the target cells of the tumour lost sensitivity to this preparation. We can observe changes in the gene expression of the following enzyme:
Correct answer	Dihydrofolate reductase
B	Thiminase
C	Desaminase
D	Folate oxidase
E	Folate decarboxylase
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	After consumption of rich food a patient has nausea and heartburn, steatorrhea. This condition might be caused by:

Correct answer	Bile acid deficiency
B	Increased lipase secretion
C	Disturbed tripsin synthesis
D	Amylase deficiency
E	Disturbed phospholipase synthesis
№	krok 2008
Topic	Anabolism of carbohydrates
Task	A 3 year old child with fever was given aspirin. It resulted in intensified erythrocyte haemolysis. Hemolytic anemia might have been caused by congenital insufficiency of the following enzyme:
Correct answer	Glucose 6-phosphate dehydrogenase
B	Glucose 6-phosphatase
C	Glycogen phosphorylase
D	Glycerol phosphate dehydrogenase
E	$\gamma$ -glutamyltransferase
№	krok 2008, 2010
Topic	: Mechanisms of gas metabolism
Task	A patient is ill with diabetes mellitus accompanied by hyperglycemia on an empty stomach (7,2 millimole/l). The hyperglycemia rate can be retrospectively estimated (over the last 48 weeks before the examination) on the ground of the rate of the following blood plasma protein:
Correct answer	Glycated hemoglobin
B	Albumin
C	Fibrinogen
D	C-reactive protein
E	Ceruloplasmin
№	krok 2008
Topic	Nucleic acid metabolism. Protein synthesis
Task	It was proved that a molecule of immature mRNA (precursor mRNA) contained more triplets than amino acids found in the synthesized protein. The reason for that is that translation is normally preceded by:
Correct answer	Processing
B	Initiation
C	Reparation
D	Mutation

E	Replication
№	krok 2008, 2010
Topic	Nucleic acid metabolism. Protein synthesis
Task	A patient has low rate of magnesium ions that are necessary for affixion of ribosomes to the endoplasmic reticulum. It is known that it causes disturbance of protein biosynthesis. At what stage is protein biosynthesis impaired?
Correct answer	Translation
B	Transcription
C	Replication
D	Amino acid activation
E	Termination
№	krok 2008, 2010
Topic	Anabolism of carbohydrates
Task	A patient ill with neurodermatitis has been taking prednisolone for a long time. Examination revealed high rate of sugar in his blood. This complication is caused by the drug influence upon the following link of carbohydrate metabolism:
Correct answer	Gluconeogenesis activation
B	Glycogenogenesis activation
C	Intensification of glucose absorption in the bowels
D	Inhibition of glycogen synthesis
E	Activation of insulin decomposition
№	krok 2008, 2010
Topic	Nucleic acid metabolism. Protein synthesis
Task	Labelled amino acids alanine and tryptophane were injected to a mouse in order to study localization of protein synthesis in its cells. The labelled amino acids will be accumulated near the following organellas:
Correct answer	Ribosomes
B	Smooth endoplasmic reticulum
C	Cell centre
D	Lysosomes
E	Golgi apparatus
№	krok 2008
Topic	Blood fundamental
Task	A patient has yellow skin colour, dark urine, dark-yellow feces. What substance will have strengthened concentration in the blood serum?



Correct answer	Unconjugated bilirubin
B	Conjugated bilirubin
C	Mesobilirubin
D	Verdoglobin
E	Biliverdin
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient consulted a doctor about symmetric dermatitis of open skin areas. It was found out that the patient lived mostly on cereals and ate too little meat, milk and eggs. What vitamin deficiency is the most evident?
Correct answer	Nicotinamide
B	Calciferol
C	Folic acid
D	Biotin
E	Tocopherol
№	krok 2008
Topic	Nucleotide metabolism
Task	A 46 year old patient applied to a doctor complaining about joint pain that becomes stronger the day before weather changes. Blood examination revealed strengthened concentration of uric acid. The most probable cause of the disease is the intensified disintegration of the following substance:
Correct answer	Adenosine monophosphate
B	Cytidine monophosphate
C	Uridine triphosphate
D	Uridine monophosphate
E	Thymidine monophosphate
№	krok 2008
Topic	Blood fundamental
Task	A 38 year old patient suffers from rheumatism in its active phase. What laboratory characteristic of blood serum is of diagnostic importance in case of this pathology?
Correct answer	C-reactive protein
B	Uric acid
C	Urea
D	Creatinine

E	Transferrin
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient underwent an operation on account of gall bladder excision that resulted in obstruction of <i>C a</i> absorption through the bowels wall. What vitamin wil stimulate this process?
Correct answer	<i>D</i> <sub>3</sub>
B	<i>P P</i>
C	<i>C</i>
D	<i>B</i> <sub>12</sub>
E	<i>K</i>
№	krok 2008
Topic	Nucleotide metabolism
Task	A 65 year old man suffering from gout complains of kidney pain. Ultrasound examination revealed renal calculi. The most probable cause of calculi formation is the strengthened concentration of the following substance:
Correct answer	Uric acid
B	Cholesterol
C	Bilirubin
D	Urea
E	Cystine
№	krok 2008
Topic	Functional and clinical biochemistry of liver
Task	A patient is ill with hepatocirrhosis. State of antitoxic liver function can be characterized by examination of the following substance excreted by urine:
Correct answer	Hippuric acid
B	Ammonium salts
C	Creatinine
D	Uric acid
E	Amino acids
№	krok 2008
Topic	Transamination and ammonia coverision

Task	A cerebral trauma caused increased ammonia generation. What amino acid participates in the excretion of ammonia from the cerebral tissue?
Correct answer	Glutamic
B	Tyrosine
C	Valine
D	Tryptophan
E	Lysine
№	krok 2008
Topic	Catabolism of carbohydrates
Task	Myocyte cytoplasm contains a big number of dissolved metabolites of glucose oxidation. Name one of them that turns directly into a lactate:
Correct answer	Pyruvate
B	Oxaloacetate
C	Glycerophosphate
D	Glucose 6-phosphate
E	Fructose 6-phosphate
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	Vitamin B <sub>1</sub> deficiency results in disturbance of oxidative decarboxylation of $\alpha$ -ketoglutaric acid. This will disturb synthesis of the following coenzyme:
Correct answer	Thiamine pyrophosphate
B	Nicotinamide adenine dinucleotide (NAD)
C	Flavine adenine dinucleotide (FAD)
D	Lipoic acid
E	Coenzyme A
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	As a result of posttranslative modifications some proteins taking part in blood coagulation, particularly prothrombin, become capable of calcium binding. The following vitamin takes part in this process:
Correct answer	K
B	C

C	A
D	B <sub>1</sub>
E	B <sub>2</sub>
№	krok 2008, 2010
Topic	Blood fundamental
Task	Examination of a man who had been working hard under higher temperature of the environment revealed abnormal quantity of blood plasma proteins. What phenomenon is the case?
Correct answer	Relative hyperproteinemia
B	Absolute hyperproteinemia
C	Absolute hypoproteinemia
D	Dysproteinemia
E	Paraproteinemia
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 3 year old child with symptoms of stomatitis, gingivitis and dermatitis of open skin areas was delivered to a hospital. Examination revealed inherited disturbance of neutral amino acid transporting in the bowels. These symptoms were caused by the deficiency of the following vitamin:
Correct answer	Niacin
B	Pantothenic acid
C	Vitamin A
D	Cobalamin
E	Biotin
№	krok 2008
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A patient with suspected diagnosis "progressing muscular dystrophy" got his urine tested. What compound will confirm this diagnosis if found in urine?
Correct answer	Kreatine
B	Collagen
C	Porphyrin
D	Myoglobin
E	Calmodulin

№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	A doctor examined a child and revealed symptoms of rachitis. Development of this disease was caused by deficiency of the following compound:
Correct answer	1,25 [OH]-dichydroxycholecalciferol
B	Biotin
C	Tocopherol
D	Naphtaquinone
E	Retinol
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 16 year old boy after an illness has diminished function of protein synthesis in liver as a result of vitamin K deficiency. It will cause disturbance of:
Correct answer	Blood coagulation
B	Erythrocyte sedimentation rate
C	Anticoagulant generation
D	Erythropoietin secretion
E	Osmotic blood pressure
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	Surgical removal of a part of stomach resulted in disturbed absorption of vitamin B <sub>12</sub> , it is excreted with feces. The patient was diagnosed with anemia. What factor is necessary for absorption of this vitamin?
Correct answer	Gastromucoprotein
B	Gastrin
C	Hydrochloric acid
D	Pepsin
E	Folic acid
№	krok 2008
Topic	Characteristics and intracellular lipid metabolism

Task	A 6 year old child was delivered to a hospital. Examination revealed that the child couldn't fix his eyes, didn't keep his eyes on toys, eye ground had the cherryred spot sign. Laboratory analyses showed that brain, liver and spleen had high rate of ganglioside glycometide. What congenital disease is the child ill with?
Correct answer	Tay-Sachs disease
B	Wilson's syndrome
C	Turner's syndrome
D	Niemann-Pick disease
E	MacArdle disease
№	krok 2008
Topic	Blood fundamental
Task	A 70 year old man is ill with vascular atherosclerosis of lower extremities and coronary heart disease. Examination revealed disturbance of lipidic blood composition. The main factor of atherosclerosis pathogenesis is the excess of the following lipoproteins:
Correct answer	Low-density lipoproteins
B	Cholesterol
C	High-density lipoproteins
D	Intermediate density lipoproteins
E	Chylomicrons
№	krok 2008
Topic	Nutrition biochemistry and vitamins fundamental
Task	Examination of a 35 year old patient revealed high acidity of gastric juice. What receptors should be blocked in order to reduce it?
Correct answer	Histamine
B	$\alpha_1$ -adrenoreceptors
C	$\alpha_2$ -adrenoreceptors
D	$\beta_1$ -adrenoreceptors
E	$\beta_2$ -adrenoreceptors
№	krok 2008
Topic	Hormonal regulation of metabolism
Task	A patient had hemorrhagic stroke. Blood examination revealed strengthened kinin concentration. The patient was prescribed contrical. It was administered in order to inhibit the following proteinase:
Correct answer	Kallikrein
B	Pepsin

C	Trypsin
D	Chemotrypsin
E	Collagenase
№	krok 2008
Topic	topic: Nutrition biochemistry and vitamins fundamental
Task	Plasmic factors of blood coagulation are exposed to posttranslational modification with the participation of vitamin K . It is necessary as a cofactor in the enzyme system of $\gamma$ -carboxylation of protein factors of blood coagulation due to the increased affinity of their molecules with calcium ions. What amino acid is carboxylated in these proteins?
Correct answer	Glutamic
B	Valine
C	Serine
D	Phenylalanine
E	Arginine
№	krok 2008
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Pharmacological effects of antidepressants are connected with inhibition of an enzyme catalyzing biogenic amines noradrenaline and serotonin in the mitochondrions of cerebral neurons. What enzyme participates in this process?
Correct answer	Monoamine oxidase
B	Transaminase
C	Decarboxylase
D	Peptidase
E	Lyase
№	krok 2008
Topic	Nucleic acid metabolism. Protein synthesis
Task	An oncological patient was prescribed methotrexate. With the lapse of time target cells of the tumour lost susceptibility to this drug. There is change of gene expression of the following enzyme:
Correct answer	Dehydrofolate reductase
B	Thiaminase
C	Deaminase
D	Folate oxidase
E	Folate decarboxylase
№	krok 2007

Topic	Mechanisms of gas metabolism
Task	A patient is ill with diabetes mellitus that is accompanied by hyperglycemia of over 7,2 millimole/l on an empty stomach. The level of what blood plasma protein allows to estimate the glycemia rate retrospectively (4-8 weeks before examination)?
Correct answer	Glycated hemoglobin
B	Albumin
C	Fibrinogen
D	C-reactive protein
E	Ceruloplasmin
№	krok 2007
Topic	Nucleic acid metabolism. Protein synthesis
Task	Examination of a patient revealed reduced contents of magnesium ions that are necessary for attachment of ribosomes to the granular endoplasmatic reticulum. It is known that it causes disturbance of protein biosynthesis. What stage of protein biosynthesis will be disturbed?
Correct answer	Translation
B	Transcription
C	Replication
D	Aminoacid activation
E	Termination
№	krok 2007
Topic	Classification and mechanism of action of enzymes
Task	Analysis of blood serum of a patient revealed increase of alanine aminotransferase and aspartate aminotransferase level. What cytological changes can cause such a situation?
Correct answer	Cellular breakdown
B	Disturbed function of energy supply of cells
C	Disorder of enzyme systems of cells
D	Disturbance of genetic apparatus of cells
E	Disturbance of cellular interrelations
№	krok 2007
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A patient presents high activity of $LDH_{1,2}$ , aspartate aminotransferase, creatine phosphokinase. In what organ (organs) is the development of a pathological process the most probable?



Correct answer	In the heart muscle (initial stage of myocardium infarction)
B	In skeletal muscles (dystrophy, atrophy)
C	In kidneys and adrenals
D	In connective tissue
E	In liver and kidneys
№	krok 2007
Topic	Nucleic acid metabolism. Protein synthesis
Task	Labeled aminoacids alanine and tryptophane were introduced to a mouse in order to study localization of protein biosynthesis in its cells. Around what organelles will the accumulation of labeled aminoacids be observed?
Correct answer	Ribosomes
B	Agranular endoplasmic reticulum
C	Cell centre
D	Lysosomes
E	Golgi apparatus
№	krok 2007
Topic	Nucleic acid metabolism. Protein synthesis
Task	In some regions of South Africa there is a spread sickle-shaped cell anemia, in which erythrocytes have shape of a sickle as a result of substitution of glutamin by valine in the hemoglobin molecule. What is the cause of this disease?
Correct answer	Gene mutation
B	Disturbance of mechanisms of genetic information realization
C	Crossingover
D	Genomic mutations
E	Transduction
№	krok 2007
Topic	Transamination and ammonia conversion
Task	Ammonia is a very toxic substance, especially for nervous system. What substance takes the most active part in ammonia detoxication in brain tissues?
Correct answer	Glutamic acid
B	Lysine
C	Proline
D	Histidine
E	Alanine

№	krok 2007
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	A 30 y.o. woman had been ill for a year when she felt pain in the area of joints for the first time, they got swollen and skin above them became reddened. Provisional diagnosis is rheumatoid arthritis. One of the most probable causes of this disease is a structure alteration of a connective tissue protein:
Correct answer	Collagen
B	Mucin
C	Myosin
D	Ovoalbumin
E	Troponin
№	krok 2007
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	As a result of exhausting muscular work a worker has largely reduced buffer capacity of blood. What acidic substance that came to blood caused this phenomenon?
Correct answer	Lactate
B	Pyruvate
C	1,3-bisphosphoglycerate
D	3-phosphoglycerate
E	-
№	krok 2007
Topic	Specific ways of amino acids metabolism
Task	Nappies of a newborn have dark spots that witness of formation of homogentisic acid. Metabolic imbalance of which substance is it connected with?
Correct answer	Thyrosine
B	Galactose
C	Methionine
D	Cholesterine
E	Tryptophane
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	A woman who has been keeping to a cleanrice diet for a long time was diagnosed with polyneuritis (beri-beri). What vitamin deficit results in development of this disease?

Correct answer	Thiamine
B	Ascorbic acid
C	Pyridoxine
D	Folic acid
E	Riboflavin
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	Removal of gall bladder of a patient has disturbed processes of <i>Ca</i> absorption through the intestinal wall. What vitamin will stimulate this process?
Correct answer	<i>D</i> <sub>3</sub>
B	<i>P P</i>
C	<i>C</i>
D	<i>B</i> <sub>12</sub>
E	<i>K</i>
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient complains of frequent diarrheas, especially after consumption of fattening food, and of body weight loss. Laboratory examination revealed steatorrhea; hypocholic feces. What can be the cause of this condition?
Correct answer	Obturation of biliary tracts
B	Mucous membrane inflammation of small intestine
C	Lack of pancreatic lipase
D	Lack of pancreatic phospholipase
E	Unbalanced diet
№	krok 2007
Topic	Catabolism of carbohydrates
Task	A child is languid, apathetic. Liver is enlarged and liver biopsy revealed a significant excess of glycogene. Glucose concentration in the blood stream is below normal. What is the cause of low glucose concentration?
Correct answer	Low (absent) activity of glycogene phosphorylase in liver
B	Low (absent) activity of hexokinase
C	High activity of glycogen synthetase
D	Low (absent) activity of glucose 6-phosphatase

E	Deficit of a gene that is responsible for synthesis of glucose 1-phosphaturidine transferase
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	After intake of rich food a patient feels nausea and sluggishness; with time there appeared signs of steatorrhea. Blood cholesterine concentration is 9,2 micromole/l. This condition was caused by lack of:
Correct answer	Bile acids
B	Triglycerides
C	Fatty acids
D	Phospholipids
E	Chylomicrons
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	Examination of a man who hadn't been consuming fats but had been getting enough carbohydrates and proteins for a long time revealed dermatitis, poor wound healing, vision impairment. What is the probable cause of metabolic disorder?
Correct answer	Lack of linoleic acid, vitamins <i>A</i> , <i>D</i> , <i>E</i> , <i>K</i>
B	Lack of palmitic acid
C	Lack of vitamins <i>P P</i> , <i>H</i>
D	Low caloric value of diet
E	Lack of oleic acid
№	krok 2007
Topic	Anabolism of carbohydrates
Task	An experimental animal has been given excessive amount of carbonlabeled glucose for a week. What compound can the label be found in?
Correct answer	Palmitic acid
B	Methionine
C	Vitamin <i>A</i>
D	Choline
E	Arachidonic acid
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	Examination of a patient with frequent hemorrhages from internals and mucous membranes revealed proline and lysine being a part of collagene fibers. What vitamin absence caused disturbance of their hydroxylation?

Correct answer	Vitamin <i>C</i>
B	Vitamin <i>K</i>
C	Vitamin <i>A</i>
D	Thiamine
E	Vitamin <i>E</i>
№	krok 2007
Topic	Functional and clinical biochemistry of liver
Task	A patient suffers from hepatic cirrhosis. Examination of which of the following substances excreted by urine can characterize the state of antitoxic function of liver?
Correct answer	Hippuric acid
B	Ammonium salts
C	Kreatinine
D	Uric acid
E	Aminoacids
№	krok 2007
Topic	Mechanism of hormonal action. Thyroid and parathyroid glands hormones
Task	A 2 y.o. child has convulsions as a result of lowered concentration of calcium ions in blood plasma. It is caused by reduced function of:
Correct answer	Parathyroid glands
B	Hypophysis
C	Adrenal cortex
D	Pineal gland
E	Thymus
№	krok 2007
Topic	Mechanism of hormonal action. Thyroid and parathyroid glands hormones
Task	A patient is followed up in an endocrinological dispensary on account of hyperthyreosis. Weight loss, tachycardia, finger tremor are accompanied by hypoxia symptoms - headache, fatigue, eye flicker. What mechanism of thyroid hormones action underlies the development of hypoxia?
Correct answer	Disjunction, oxydation and phosphorylation
B	Inhibition of respiratory ferment synthesis
C	Competitive inhibition of respiratory ferments
D	Intensification of respiratory ferment synthesis

E	Specific binding of active centres of respiratory ferments
№	krok 2007
Topic	Characteristics and intracellular lipid metabolism
Task	A sportsman was recommended to take a medication that contains carnitine in order to improve his results. What process is activated by carnitine the most?
Correct answer	Fatty acids transport to mitochondrions
B	Synthesis of steroid hormones
C	Synthesis of ketone bodies
D	Synnythesis of lipids
E	Tissue respiration
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	To prevent postoperative bleeding a 6 y.o. child was administered vicasol that is a synthetic analogue of vitamin K. Name posttranslational changes of blood coagulation factors that will be activated by vicasol:
Correct answer	Carboxylation of glutamin acid
B	Phosphorylation of serine radicals
C	Partial proteolysis
D	Polymerization
E	Glycosylation
№	krok 2007
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient has a disturbed absorbtion of fat hydrolysates. It might have been caused by a deficit in the small intestine cavity:
Correct answer	Of bile acids
B	Of bile pigments
C	Of lipolytic enzymes
D	Of sodium ions
E	Of liposoluble vitamins
№	krok 2007
Topic	Specific ways of amino acids metabolism
Task	Glutamate decarboxylation results in formation of inhibitory transmitter in CNS. Name it:
Correct answer	GABA
B	Glutathione

C	Histamine
D	Serotonin
E	Asparagine
№	krok 2007
Topic	Specific ways of amino acids metabolism
Task	In course of histidine catabolism a biogenic amin is formed that has powerful vasodilatating effect. Name it:
Correct answer	Histamine
B	Serotonin
C	Dioxyphenylalanine
D	Noradrenalin
E	Dopamine
№	krok 2007
Topic	Hormonal regulation of metabolism
Task	Utilization of arachidonic acid via cyclooxygenase pathway results in formation of some bioactive substances. Name them:
Correct answer	Prostaglandins
B	Thyroxine
C	Biogenicamins
D	Somatomedins
E	Insulin-like growth factors
№	krok 2007
Topic	Specific ways of amino acids metabolism
Task	A patient diagnosed with carcinoid of bowels was admitted to the hospital. Analysis revealed high production of serotonin. It is known that this substance is formed of tryptophane aminoacid. What biochemical mechanism underlies this process?
Correct answer	Decarboxylation
B	Desamination
C	Microsomal oxydation
D	Transamination
E	Formation of paired compounds
№	krok 2007
Topic	Catabolism of carbohydrates
Task	A child's blood presents high content of galactose, glucose concentration is low. There are such presentations as cataract, mental deficiency, adipose degeneration of liver. What disease is it?

Correct answer	Galactosemia
B	Diabetes mellitus
C	Lactosemia
D	Steroid diabetes
E	Fructosemia
№	krok 2007
Topic	Transamination and ammonia conversion
Task	According to clinical indications a patient was administered pyridoxal phosphate. What processes is this medication intended to correct?
Correct answer	Transamination and decarboxylation of aminoacids
B	Oxidative decarboxylation of ketonic acids
C	Desamination of purine nucleotide
D	Synthesis of purine and pyrimidine bases
E	Protein synthesis
№	krok 2007
Topic	Hormonal regulation of metabolism
Task	A 45 y.o. woman suffers from Cushing's syndrome - steroid diabetes. Biochemical examination revealed: hyperglycemia, hypochloremia. Which of the undermentioned processes is the first to be activated?
Correct answer	Gluconeogenesis
B	Glycogenolysis
C	Glucose reabsorption
D	Glucose transport to the cell
E	Glycolysis
№	krok 2007
Topic	Characteristics and intracellular lipid metabolism
Task	A 1 y.o. child with symptoms of muscle affection was admitted to the hospital. Examination revealed carnitine deficit in muscles. Biochemical base of this pathology is disturbed process of:
Correct answer	Transporting of fatty acids to mitochondrions
B	Regulation of $Ca^{2+}$ rate in mitochondrions
C	Substrate phosphorylation
D	Lactic acid utilization



E	Actin and myosin synthesis
№	krok 2007
Topic	Characteristics and intracellular lipid metabolism
Task	Examination of cell culture got from a patient with lysosomal pathology revealed accumulation of great quantity of lipids in the lysosomes. What of the following diseases is this disturbance typical for?
Correct answer	Tay-Sachs disease
B	Gout
C	Phenylketonuria
D	Wilson disease
E	Galactosemia
№	krok 2010
Topic	Specific ways of amino acids metabolism
Task	Examination of a patient suffering from cancer of urinary bladder revealed high rate of serotonin and hydroxyanthranilic acid. It is caused by excess of the following amino acid in the organism:
Correct answer	Tryptophan
B	Alanine
C	Histidine
D	Methionine
E	Tyrosine
№	krok 2010
Topic	Nucleotide metabolism
Task	Blood of a 12 year old boy presents low concentration of uric acid and accumulation of xanthine and hypoxanthine. This child has genetic defect of the following enzyme:
Correct answer	Xanthine oxidase
B	Arginase
C	Urease
D	Ornithine carbamoyltransferase
E	Glycerolkinase
№	krok 2010
Topic	Functional and clinical biochemistry of liver
Task	A full-term newborn child has yellowish skin and mucous membranes. This might be probably caused by temporary deficiency of the following enzyme:

Correct answer	UDPglucoronyltransferase
B	Uridine transferase
C	Heme synthetase
D	Heme oxygenase
E	Biliverdin reductase
№	krok 2010
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Examination of a patient revealed typical presentations of collagenosis. This pathology is characterized by increase of the following urine index:
Correct answer	Hydroxyproline
B	Arginine
C	Glucose
D	Mineral salts
E	Ammonium salts
№	krok 2010
Topic	Nutrition biochemistry and vitamins fundamental
Task	Examination of a patient suffering from frequent haemorrhages in the inner organs and mucous membranes revealed proline and lysine being included in collagen fibers. Impairment of their hydroxylation is caused by lack of the following vitamin:
Correct answer	C
B	E
C	K
D	A
E	
№	krok 2010
Topic	Nucleotide metabolism
Task	A 48 year old patient complained about intense pain, slight swelling and reddening of skin over the joints, temperature rise up to 38° C . Blood analysis revealed high concentration of urates. This condition might be caused by disturbed metabolism of:
Correct answer	Purines
B	Collagen
C	Cholesterol
D	Pyrimidines

E	Carbohydrates
№	krok 2010
Topic	Functional and clinical biochemistry of liver
Task	A 46 year old woman suffering from cholelithiasis developed jaundice. Her urine became dark-yellow and feces became colourless. Blood serum will have the highest concentration of the following substance:
Correct answer	Conjugated bilirubin
B	Unconjugated bilirubin
C	Biliverdin
D	Mesobilirubin
E	Urobilinogen
№	krok 2010
Topic	Nutrition biochemistry and vitamins fundamental
Task	A newborn child has convulsions that have been observed after prescription of vitamin $B_6$ . This most probable cause of this effect is that vitamin $B_6$ is a component of the following enzyme:
Correct answer	Glutamate decarboxylase
B	Pyruvate dehydrostase
C	Netoglubarate dehydromine
D	Aminolevulinate synthase
E	Glycogen phosphorylase
№	krok 2010
Topic	Mechanisms of urine formation. Pathological components in urine
Task	A patient suffers from hepatocirrhosis. State of antitoxic liver function can be characterized by examination of the following substance excreted by urine:
Correct answer	Hippuric acid
B	Ammonium salts
C	Creatinine
D	Uric acid
E	Amino acids
№	krok 2010
Topic	Nutrition biochemistry and vitamins fundamental

Task	A clinic observes a 49 year old patient with significant prolongation of coagulation time, gastrointestinal haemorrhages, subcutaneous hematomas. These symptoms might be explained by the deficiency of the following vitamin:
Correct answer	<i>K</i>
B	<i>B<sub>1</sub></i>
C	<i>B<sub>6</sub></i>
D	<i>H</i>
E	<i>E</i>
№	krok 2010
Topic	Transamination and ammonia conversion
Task	A cerebral trauma caused increased ammonia generation. What amino acid participates in the excretion of ammonia from the cerebral tissue?
Correct answer	Glutamic
B	Tyrosine
C	Valine
D	Tryptophan
E	Lysine
№	krok 2010
Topic	Hormonal regulation of metabolism
Task	People adapted to high external temperatures have such peculiarity: profuse sweating isn't accompanied by loss of large volumes of sodium chloride. This is caused by the effect of the following hormone upon the perspiratory glands:
Correct answer	Aldosterone
B	Vasopressin
C	Cortisol
D	Tyroxin
E	Natriuretic
№	krok 2010
Topic	Mechanism of hormonal action. Thyroid and parathyroid glands hormones
Task	Emotional stress causes activation of hormon-sensitive triglyceride lipase in the adipocytes. What secondary mediator takes part in this process?
Correct answer	Cyclic adenosine monophosphate
B	Cyclic guanosine monophosphate

C	Adenosine monophosphate
D	Diacylglycerol
E	Ions of $^{2+}$
№	krok 2010
Topic	Mechanisms of gas metabolism
Task	A 25 year old Palestinian woman complains of weakness, dizziness, dyspnea. In anamnesis: periodically exacerbating anemia. In blood: Hb - 60 g/l, erythrocytes $2,5 \cdot 10^{12}/l$ , reticulocytes - $35\%$ , anisocytosis and poikilocytosis of erythrocytes, a lot of target cells and polychromatophils. What type of anemia is it?
Correct answer	Thalassemia
B	Sickle-cell anemia
C	Minkowsky-Shauffard disease
D	Addison-Biermer disease
E	Glucose 6-phosphate dehydrogenase-deficient anemia
№	krok 2010
Topic	Characteristics and intracellular lipid metabolism
Task	A sportsman needs to improve his sporting results. He was recommended to take a preparation that contains carnitine. What process is activated the most by this compound?
Correct answer	Fatty acids transporting
B	Amino acids transporting
C	Calcium ions transporting
D	Glucose transporting
E	Vitamin K transporting
№	krok 2010
Topic	Specific ways of amino acids metabolism
Task	Laboratory examination of a child revealed increased concentration of leucine, valine, isoleucine and their ketoderivatives in blood and urine. Urine smelt of maple syrup. This disease is characterized by the deficit of the following enzyme:
Correct answer	Dehydrogenase of branched amino acids
B	Aminotransferase
C	Glucose-6-phosphatase
D	Phosphofructokinase
E	Phosphofructomutase

№	krok 2010
Topic	Catabolism of carbohydrates
Task	When blood circulation in the damaged tissue is restored, then lactate accumulation comes to a stop and glucose consumption decelerates. These metabolic changes are caused by activation of the following process:
Correct answer	Aerobic glycolysis
B	Anaerobic glycolysis
C	Lipolysis
D	Gluconeogenesis
E	Glycogen biosynthesis
№	krok 2010
Topic	Cholesterol metabolism. Ketone bodies
Task	Patients who suffer from severe diabetes and don't receive insulin have metabolic acidosis. This is caused by increased concentration of the following metabolites:
Correct answer	Ketone bodies
B	Fatty acids
C	Unsaturated fatty acids
D	Triacylglycerols
E	Cholesterol
№	krok 2018
Topic	Classification and mechanism of action of enzymes
Task	Protective function of saliva is based on several mechanisms, including the presence of enzyme that has bactericidal action and causes lysis of complex capsular polysaccharides of staphylococci and streptococci. Name this enzyme:
Correct answer	Lysozyme
B	$\alpha$ -amylase
C	Oligo-1,6-glucosidase
D	Collagenase
E	$\beta$ -glucuronidase
№	krok 2018
Topic	Functional and clinical biochemistry of muscle, nervous and connective tissues
Task	Collagenosis patients typically present with connective tissue destruction processes. The presence of these processes can be confirmed by the increase in:
Correct answer	Blood oxyproline and oxylysine

B	Blood creatine and creatinine
C	LDH-isoenzyme activity in the blood
D	Transaminase activity in the blood
E	Blood urates
№	krok 2018
Topic	Nucleotide metabolism
Task	A 42-year-old man with gout presents with high content of uric acid in blood. The patient was prescribed allopurinol to lower the concentration of uric acid. Allopurinol is a competitive inhibitor of the following enzyme:
Correct answer	Xanthine oxidase
B	Adenosine deaminase
C	Adenine phosphoribosyltransferase
D	Hypoxanthine phosphoribosyltransferase
E	Guanine deaminase
№	krok 2018
Topic	Transamination and ammonia conversion
Task	Nitrogen is being excreted from the body mainly as urea. When activity of a certain enzyme in the liver is low, it results in inhibition of urea synthesis and nitrogen accumulation in blood and tissues. Name this enzyme:
Correct answer	Carbamoyl phosphate synthetase
B	Aspartate aminotransferase
C	Urease
D	Amylase
E	Pepsin
№	krok 2018
Topic	Catabolism of carbohydrates
Task	People, who for a long time remained in hypodynamic state, develop intense pain in the muscles after a physical exertion. What is the most likely cause of this pain?
Correct answer	Accumulation of lactic acid in muscles
B	Intensive breakdown of muscle proteins
C	Accumulation of creatinine in muscles
D	Decreased content of lipids in muscles
E	Increased content of ADP in muscles
№	krok 2018

Topic	Functional and clinical biochemistry of liver
Task	A patient suffers from hepatic cirrhosis. What substance excreted in urine should be analyzed to characterize the antitoxic function of liver?
Correct answer	Hippuric acid
B	Ammonium salts
C	Creatinine
D	Uric acid
E	Amino acids
№	krok 2018
Topic	Characteristics and intracellular lipid metabolism
Task	Blood of the patients with diabetes mellitus shows increased content of free fatty acids. Name the most likely cause of this:
Correct answer	Increased activity of adipose triglyceride lipase
B	Accumulation of palmitoyl-CoA in cytosol
C	Activation of ketone bodies utilization
D	Activation of apoA1, apoA2, and apoA4 apolipoprotein synthesis
E	Decreased activity of plasma phosphatidylcholine-cholesterol-acyltransferase
№	krok 2018
Topic	Nutrition biochemistry and vitamins fundamental
Task	Patients with bile duct obstruction typically present with inhibited blood clotting and develop hemorrhages due to insufficient assimilation of vitamin:
Correct answer	<i>K</i>
B	<i>A</i>
C	<i>D</i>
D	<i>E</i>
E	<i>C</i>
№	krok 2018
Topic	Nutrition biochemistry and vitamins fundamental
Task	A woman has been limiting the amount of products in her diet to lose some weight. 3 months later she developed edemas and her diuresis increased. What dietary component deficiency is the cause of this?
Correct answer	Proteins
B	Fats
C	Carbohydrates



D	Vitamins
E	Minerals
№	krok 2018
Topic	Anabolism of carbohydrates
Task	During intensive muscle work there is a large amount of ammonia produced in the muscles. What amino acid plays the main role in the transportation of ammonia to the liver and participates in gluconeogenesis reactions?
Correct answer	Alanine
B	Arginine
C	Lysine
D	Ornithine
E	Aspartate
№	krok 2018
Topic	Hormonal regulation of metabolism
Task	A 40-year-old woman suffers from Cushing's disease - steroid diabetes. On biochemical examination she has hyperglycemia and hypochloremia. What process activates in the first place in such patients?
Correct answer	Gluconeogenesis
B	Glycogenolysis
C	Glucose reabsorption
D	Glucose transport to the cells
E	Glycolysis
№	krok 2018
Topic	Functional and clinical biochemistry of liver
Task	Neutralization of xenobiotics and active endogenous metabolites often occurs via introduction of an oxygen atom into the substrate molecule. What process occurs as the result?
Correct answer	Hydroxylation
B	Decarboxylation
C	Transamination
D	Phosphorilation
E	Deaminization
№	krok 2018
Topic	Anabolism of carbohydrates

Task	During intensive physical exertion, one of the energy sources for the working muscles is glucose produced as the result of gluconeogenesis. This process is the most intensive in the following organ:
Correct answer	Liver
B	Brain
C	Lungs
D	Muscles
E	Stomach
№	krok 2018
Topic	Specific ways of amino acids metabolism
Task	During hypersensitivity skin test a patient received an allergen subcutaneously, after which the patient developed skin redness, edema, and pain due to histamine action. This biogenic amine is produced as the result of the following transformation of histidine amino acid:
Correct answer	Decarboxylation
B	Methylation
C	Phosphorilation
D	Isomerization
E	Deaminization
№	krok 2018
Topic	Specific ways of amino acids metabolism
Task	A sick child presents with high content of phenyl pyruvate in urine (normally it is practically absent). Blood phenylalanine level is 350 mg/L (norm - 15 mg/L). What disease are these symptoms characteristic of?
Correct answer	Phenylketonuria
B	Albinism
C	Tyrosinosis
D	Alkaptonuria
E	Gout
№	krok 2018
Topic	Transamination and ammonia conversion
Task	A newborn presents with weak suckling, frequent vomiting, and hypotonia. Blood and urine citrulline are very high. What metabolic process is disturbed?
Correct answer	Ornithine cycle
B	Tricarboxylic acid cycle
C	Glycolysis

D	Gluconeogenesis
E	Cori cycle
№	krok 2018
Topic	Nutrition biochemistry and vitamins fundamental
Task	Stool test detects in the patients feces a large amount of undigested fats. This patient is the most likely to have disturbed secretion of the following enzymes:
Correct answer	Pancreatic lipases
B	Pancreatic amylase
C	Pancreatic proteases
D	Bile lipase
E	Gastric protease
№	krok 2018
Topic	Hormonal regulation of metabolism
Task	To stimulate the labor activity a parturient woman was prescribed a drug - a posterior pituitary hormone that does not affect the blood pressure. As the pregnancy progresses, the sensitivity to this hormone increases. Name the prescribed drug:
Correct answer	Oxytocin
B	Dinoprostone
C	Dinoprost
D	Pituitrin
E	Ergotal
№	krok 2018
Topic	Lipid metabolism and its regulation
Task	A patient is diagnosed with glucocerebroside lipidosis (Gaucher's disease) that manifests as splenomegaly, liver enlargement, affected bone tissue, and neuropathies. What enzyme of complex lipid catabolism is deficient, thus causing this disease?
Correct answer	Glucocerebrosidase
B	Hexosaminidase
C	Sphingomyelinase
D	$\beta$ -galactosidase
E	Hyaluronidase
№	krok 2018
Topic	Lipid metabolism and its regulation

Task	A 3-year-old girl with mental retardation has been diagnosed with sphingomyelin lipidosis (Niemann-Pick disease). In this condition the synthesis of the following substance is disturbed:
Correct answer	Sphingomyelinase
B	Glycosyltransferase
C	Sphingosine
D	Ceramides
E	Gangliosides
№	krok 2018
Topic	Anabolism of carbohydrates
Task	A 7-year-old child presents with marked signs of hemolytic anemia. Biochemical analysis of erythrocytes determined low concentration of NADPH and reduced glutathione. What enzyme is deficient in this case leading to the biochemical changes and their clinical manifestations?
Correct answer	Glucose-6-phosphate dehydrogenase
B	Hexokinase
C	Fructokinase
D	Pyruvate kinase
E	Lactate dehydrogenase
№	krok 2018
Topic	Nutrition biochemistry and vitamins fundamental
Task	An 8-year-old girl presents with signs of disturbed twilight vision. This condition is caused by the deficiency of vitamin:
Correct answer	<i>A</i>
B	<i>E</i>
C	<i>D</i>
D	<i>K</i>
E	<i>F</i>
№	krok 2018
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 25-year-old young man came to the doctor complaining of general weakness, rapid fatigability, irritability, reduced working ability, and bleeding gums. What vitamin is likely to be deficient in this case?
Correct answer	Ascorbic acid
B	Riboflavin
C	Thiamine

D	Retinol
E	Folic acid
№	krok 2018
Topic	Nucleotide metabolism
Task	A 52-year-old man presents with fever and pain in the joints. Both of his first metatarsophalangeal articulations are deformed, swollen, and reddened. Blood urea is high. The patient is diagnosed with gout. What is the main developmental factor in the pathogenesis of this disease?
Correct answer	Hyperuricemy
B	Argininosuccinic aciduria
C	Hyperazotemia
D	Hyperaminoacidemia
E	Citrullinuria
№	krok 2019
Topic	Nutrition biochemistry and vitamins fundamental
Task	A patient, who has been subsisting exclusively on polished rice, has developed polyneuritis due to thiamine deficiency. What substance is an indicator of such avitaminosis, when it is excreted with urine?
Correct answer	Pyruvic acid
B	Uric acid
C	Phenyl pyruvate
D	Malate
E	Methylmalonic acid
№	krok 2019
Topic	Transamination and ammonia conversion
Task	Ammonia is extremely toxic for human CNS. What is the main way of ammonia neutralization in the nervous tissue?
Correct answer	Glutamine synthesis
B	Transamination
C	Ammonium salts synthesis
D	Urea synthesis
E	Formation of paired compounds
№	krok 2019
Topic	Cholesterol metabolism. Ketone bodies

Task	During diabetes mellitus and starvation, the number of acetone bodies in blood increases. These bodies are used as a source of energy and are synthesized from the following substance:
Correct answer	Acetyl-CoA
B	Ketoglutarate
C	Malate
D	Citrate
E	Succinyl-CoA
№	krok 2019
Topic	Nutrition biochemistry and vitamins fundamental
Task	Examination of a patient shows decreased leukocyte and erythrocyte count and low hemoglobin levels in peripheric blood, as well as appearance of large cells (megaloblasts). What vitamin deficiency can cause these clinical presentations?
Correct answer	Folic acid
B	Riboflavin
C	Biotin
D	Niacin
E	Ascorbic acid
№	krok 2019
Topic	Transamination and ammonia conversion
Task	A newborn presents with weak suckling, frequent vomiting, and hypotonia. Blood and urine citrulline are very high. What metabolic process is disturbed?
Correct answer	Ornithine cycle
B	Glycolysis
C	Tricarboxylic acid cycle
D	Gluconeogenesis
E	Cori cycle
№	krok 2019
Topic	Biochemistry of hormonal regulation
Task	Patients with ischemic heart disease are usually prescribed small doses of aspirin. This drug inhibits synthesis of platelet aggregation activator, thromboxane A <sub>2</sub> . What substance is this activator synthesized from?
Correct answer	Arachidonic acid
B	Homogentisic acid
C	Acetic acid

D	Glutamic acid
E	Malonic acid
№	krok 2019
Topic	Carbohydrate anabolism
Task	A 3-year-old child with elevated body temperature has taken aspirin and developed increased hemolysis of erythrocytes. In this case hemolytic anemia can be caused by congenital deficiency of the following enzyme:
Correct answer	Glucose 6-phosphate dehydrogenase
B	Glucose 6-phosphatase
C	Glycerol-phosphate dehydrogenase
D	Glycogen phosphorylase
E	Gamma-glutamyl transferase
№	krok 2019
Topic	Functional and clinical biochemistry of muscle, nervous, and connective tissues
Task	Collagenosis patients typically present with the processes of connective tissue destruction. The presence of these processes can be confirmed by the increase in:
Correct answer	Blood oxyproline and oxylysine
B	Transaminase activity in the blood
C	Blood creatine and creatinine
D	LDH-isoenzyme activity in the blood
E	Blood urates
№	krok 2019
Topic	Nutrition biochemistry and vitamins fundamentals
Task	Wernicke-Korsakoff syndrome often develops in chronic alcoholics, who have a low-vitamin diet. Decreased transketolase activity can be observed in the course of this disease. What vitamin deficiency causes this development?
Correct answer	Thiamine
B	Retinol
C	Cobalamin
D	Riboflavin
E	Niacin
№	krok 2019
Topic	Mechanism of steroid hormones action

Task	Chronic overdose of glucocorticoids leads to the development of hyperglycemia in a patient. Name the process of carbohydrate metabolism that results in elevated blood glucose levels:
Correct answer	Gluconeogenesis
B	Aerobic glycolysis
C	Glycogenolysis
D	Pentose-phosphate pathway
E	Glycogenesis
№	krok 2019
Topic	Functional and clinical biochemistry of liver
Task	A patient for a long time was on an imbalanced diet low in proteins, which resulted in hepatic fatty infiltration. This condition is likely to develop if a certain substance is absent in a person's diet. Name this substance:
Correct answer	Methionine
B	Alanine
C	Cholesterol
D	Acetic acid
E	Biotin
№	krok 2019
Topic	Carbohydrate metabolism
Task	People, who for a long time remained in hypodynamic state, develop intense pain in the muscles after a physical exertion. What is the most likely cause of this pain?
Correct answer	Accumulation of lactic acid in muscles
B	Intensive breakdown of muscle proteins
C	Increased content of ADP in muscles
D	Decreased content of lipids in muscles
E	Accumulation of creatinine in muscles
№	krok 2019
Topic	Classification and mechanism of action of enzymes
Task	Blood test of the patient revealed albumine content of 20 g/L and increased activity of lactate dehydrogenase isoenzyme 5 (LDH5). These results indicate disorder of the following organ:
Correct answer	Liver
B	Heart
C	Kidneys



D	Spleen
E	Lungs
№	krok 2019
Topic	Catabolism of carbohydrates
Task	A 7-year-old boy is diagnosed with anemia. Laboratory analysis detects pyruvate kinase deficiency in his erythrocytes. What process is disturbed in this boy, playing the main role in anemia development in this case?
Correct answer	Anaerobic glycolysis
B	Gluconeogenesis
C	Decarboxylation of amino acids
D	Anaerobic glycogenolysis
E	Deamination of amino acids
№	krok 2019
Topic	Blood fundamentals
Task	A 27-year-old patient presents with pathologic changes in the liver and brain. Blood plasma exhibits acute decrease in copper levels, while urine copper levels are elevated. The patient is diagnosed with Wilson disease. To confirm this diagnosis it is necessary to measure activity of the following enzyme in the patient's blood serum:
Correct answer	Ceruloplasmin
B	Carbonic anhydrase
C	Xanthine oxidase
D	Alcohol dehydrogenase
E	Leucine aminopeptidase
№	krok 2019
Topic	Characteristics and intracellular lipid metabolism
Task	A mother of a 4-month-old male infant brought him to pediatrician with complaints of food rejection and weight loss. He started having trouble latching onto his bottle. He has also become extremely lethargic. Examination reveals diminished muscle tone in all four limbs, and hepatosplenomegaly. An ophthalmoscopic exam reveals macular cherry red spots. During the next few weeks, hepatosplenomegaly progresses, the boy fails to thrive, and he continues to reject food. Chest X-ray shows a reticulonodular pattern and calcified nodules. Biopsy of the liver shows foamy histiocytes. A Niemann-Pick disease is suspected. Which of the following is the most likely deficient enzyme in this patient?
Correct answer	Sphingomyelinase
B	Phenylalanine-hydroxylase
C	Glucocerebrosidase

D	Glucose-6-phosphatase
E	Galactocerebrosidase
№	krok 2019
Topic	Nutrition biochemistry and vitamins fundamental
Task	A 37-year-old man is admitted to hospital with mental confusion and disorientation. His wife reports he became more irritable and forgetful in the past year. In addition, she notes that he became a vegan a year ago, and currently, his diet consists of starchy foods like potatoes, corn, and leafy vegetables. GI symptoms include anorexia, diarrhea and vomiting. He has glossitis and skin lesions that appear as vesicles over the extremities. Eczema-like lesions around the mouth, as well as desquamation and roughened skin over the hands are also present. Neurologic examination reveals symmetrical hypesthesia for all types of sensation in both upper and lower extremities in a "gloves and socks" distribution. Deficiency in diet of which of the following amino acids is the most likely cause of this condition?
Correct answer	Tryptophan
B	Histidine
C	Lysine
D	Arginine
E	Threonine
№	krok 2020
Topic	Nucleotide metabolism
Task	Secretion of orotic acid many times exceeds the norm in patients with hereditary orotic aciduria. This pathology is associated with disturbed synthesis of:
Correct answer	Pyrimidine nucleotides
B	Uric acid
C	Purine nucleotides
D	Biogenic amines
E	Urea
№	krok 2020
Topic	The study of membranes
Task	A diet must contain fats. What plasticity function do they fulfill in the body?
Correct answer	They are a part of cellular membranes
B	They are a part of cellular ion channels
C	They are a part of cellular ion pumps
D	They are a part of cellular receptors

E	They are a part of glycocalyx
№	krok 2020
Topic	Mechanism of steroid hormones action.
Task	A patient with neurodermatitis was taking prednisolone for a long time. Examination revealed high blood glucose. This complication occurs, when glucocorticosteroids affect a certain stage of carbohydrate metabolism. What stage of carbohydrate metabolism is affected?
Correct answer	Gluconeogenesis activation
B	Activation of the insulin breakdown
C	Increased absorption of glucose in the intestine
D	Glycogen synthesis activation
E	Glycogen synthesis inhibition
№	krok 2020
Topic	Nucleotide metabolism
Task	It is a known fact that in the human body the biosynthesis of purine nucleotides occurs de novo from amino acids. Name the amino acids that are used in the synthesis of the purine nucleotide cycle:
Correct answer	Glycine, aspartate, glutamine
B	Proline, tyrosine, phenylalanine
C	Leucine, glutamine, cysteine
D	Methionine, tryptophan, alanine
E	Isoleucine, serine, valine
№	krok 2020
Topic	Intracellular metabolism of lipids
Task	A 2-year-old child presents with marked delay in psychomotor development, vision and hearing deterioration, marked enlargement of the liver and spleen. The child is diagnosed with hereditary Niemann-Pick disease. What genetic defect is the cause of this disease?
Correct answer	Sphingomyelinase deficiency
B	Acid lipase deficiency
C	Amylo-1,6-glucosidase deficiency
D	Glucose 6-phosphatase deficiency
E	Xanthine oxidase deficiency
№	krok 2020
Topic	Nucleic acid metabolism. Protein synthesis

Task	It has been found experimentally that activation of amino acids and their binding to the tRNA is an important stage of preparation for protein synthesis in the cells. What substance takes part in this process?
Correct answer	ATP
B	FAD
C	Coenzyme A
D	Phosphoric acid
E	NAD+
№	krok 2020
Topic	Intracellular metabolism of lipids
Task	A woman complains that her child is unwell:the child developed loss of appetite, insomnia, and irritability. Biochemical testing shows that there is no glucocerebrosidase enzyme in the child's blood. It is characteristic of the following pathology:
Correct answer	Gaucher disease
B	Tay-Sachs disease
C	Pompe disease (glycogen storage disease type II)
D	Niemann-Pick disease
E	Von Gierke disease (glycogen storage disease type I)
№	krok 2020
Topic	Water and fat soluble vitamins
Task	One of the causes of pernicious anemia is the disturbed synthesis of transcobalamin - Castle's intrinsic factor - in the parietal cells of the stomach. What substance is called Castle's extrinsic factor?
Correct answer	Cobalamin
B	Biotin
C	Riboflavin
D	Folic acid
E	Pyridoxine
№	krok 2020
Topic	Water and fat soluble vitamins
Task	A patient complains of stomachache. Biochemical testing revealed decreased secretory function of the stomach accompanied by anemia. Hypovitaminosis B12 and development of anemia are caused by the low levels of a certain substance. What substance is it?
Correct answer	Castle factor
B	Biotin
C	Pyridoxine

D	Thiamine
E	Calciferol
№	krok 2020
Topic	Nucleic acid metabolism. Protein synthesis
Task	Protein synthesis occurs in several stages. During one of them, messenger RNA is being synthesized on one of the strands of a DNA segment. Name this process:
Correct answer	Transcription
B	Termination
C	Elongation
D	Translation
E	Replication
№	krok 2020
Topic	Nutrition biochemistry and vitamins fundamentals
Task	Vitamin B1 deficiency impairs oxidative decarboxylation of alpha-ketoglutaric acid, which leads to disturbed synthesis of a certain coenzyme. Name this coenzyme:
Correct answer	Thiamine pyrophosphate (TPP)
B	Lipoic acid
C	Nicotinamide adenine dinucleotide (NAD)
D	Flavin adenine dinucleotide (FAD)
E	Coenzyme A
№	krok 2020
Topic	Cellular respiration mechanisms. Peroxide and microsomal oxidation
Task	Electrons release their energy, when they are being transported in the course of tissue respiration. This energy is used for the following process:
Correct answer	Oxidative phosphorylation
B	Substrate-level phosphorylation
C	Lipid mobilization
D	Microsomal oxidation
E	Peroxidation
№	krok 2020
Topic	Gaseous metabolism mechanism

Task	Mother of a 5-year-old child complains that her child develops itching skin, erythema, and vesicular rash after exposure to the sun. Blood test revealed low levels of iron in the blood serum. Urine contains increased levels of uroporphyrinogen I. What hereditary pathology is the most likely in this child?
Correct answer	Erythropoietic porphyria
B	Coproporphyrin
C	Methemoglobinemia
D	Hepatic porphyria
E	Intermittent porphyria
№	krok 2020
Topic	Water and fat soluble vitamins
Task	After eating raw eggs the patient developed dermatitis. What type of avitaminosis is it?
Correct answer	Biotin deficiency
B	Folic acid deficiency
C	Para-aminobenzoic acid deficiency
D	Inositol deficiency
E	Pantothenic acid deficiency
№	krok 2020
Topic	Special pathways of amino acids metabolism
Task	Blood of a patient with bladder cancer has high levels of serotonin and hydroxyanthranilic acid, because of excessive intake of a certain amino acid. Name this amino acid:
Correct answer	Tryptophan
B	Methionine
C	Tyrosine
D	Histidine
E	Alanine
№	krok 2020
Topic	Fundamentals of Molecular Genetics
Task	T- lymphocytes were affected by HIV In the process, viral enzyme reverse transcriptase (RNA-dependent DNA- polymerase) catalyzes the synthesis of:
Correct answer	DNA on the viral RNA matrix
B	Viral RNA on the DNA matrix
C	Viral DNA on the DNA matrix

D	Viral protein on the viral RNA matrix
E	Informational RNA on the viral protein matrix
№	krok 2020
Topic	Functional and clinical biochemistry of liver
Task	The patient underwent blood test that showed albumin of 20 g/L and increased activity of lactate dehydrogenase isoenzyme 5
Correct answer	Liver
B	Spleen
C	Heart
D	Kidneys
E	Lungs
№	krok 2020
Topic	Carbohydrate catabolism
Task	An experiment demonstrates that Jensen sarcoma leads to a significant increase in glucose uptake from the tumor afferent artery, while tumor efferent vein has high levels of lactic acid. This phenomenon indicates:
Correct answer	Decreased anaerobic glycolysis
B	Intensified anaerobic glycolysis
C	Intensified oxidizing processes
D	Intensified protein oxidation
E	Decreased oxidizing processes
№	krok 2020
Topic	Water and fat soluble vitamins
Task	A 10-year-old homeless boy was brought to the admission room with a severe case of bronchitis. Objectively, the child is exhausted; he presents with delayed physical development, dry peeling skin, trophic ulcers in some places, and a loss of twilight vision ("night-blindness"). What vitamin supplements should be prescribed to this boy?
Correct answer	Retinol acetate
B	Pyridoxine hydrochloride
C	Ascorbic acid
D	Cyanocobalamin
E	Tocopherol acetate
№	krok 2020
Topic	Nutrition biochemistry and vitamins fundamentals.

Task	A 60-year-old man complains of pain in his lower abdomen and frequent stools. Stool analysis shows increased levels of neutral fats in the patient's feces. Incomplete digestion of fats is caused by the deficiency of a certain enzyme. Name this enzyme:
Correct answer	Lipase
B	Aminopeptidase
C	Enterokinase
D	Pepsin
E	Maltase
№	krok 2020
Topic	Special pathways of amino acids metabolism
Task	A test animal kept on a low-protein diet developed fatty infiltration of the liver due to low levels of methylating agents. What amino acid is a methylating agent?
Correct answer	Methionine
B	Cysteine
C	Phenylalanine
D	Valine
E	Tyrosine
№	krok 2020
Topic	Nutrition biochemistry and vitamins fundamentals.
Task	A patient with cholelithiasis has fatty colorless stool because of obturation of the biliary tract. What bile component is absent, causing steatorrhea?
Correct answer	Bile acids
B	Bile pigments
C	Cholesterol
D	Alkaline phosphatase
E	Fatty acids
№	krok 2020
Topic	Intracellular metabolism of lipids
Task	A patient is diagnosed with glucocerebroside lipidoses (Gaucher's disease) that manifests as splenomegaly, liver enlargement, affected bone tissue, and neuropathies. What enzyme of complex lipid catabolism is deficient, causing this disease?
Correct answer	Glucocerebrosidase
B	$\beta$ -galactosidase
C	Hexosaminidase



D	Sphingomyelinase
E	Hyaluronidase
№	krok 2020
Topic	Water and fat soluble vitamins
Task	A patient has frequent visceral and mucosal hemorrhages. Analysis shows that the collagen fibers in the patient's body lack hydroxyproline and hydroxy lysine. The hydroxylation processes of these amino acids are disrupted because of a vitamin deficiency. What vitamin is deficient in this case?
Correct answer	C
B	K
C	H
D	A
E	PP
№	krok 2021
Topic	Functional and cellular biochemistry of the liver
Task	Absence or insufficient production of lipotropic factors in the human body causes development of fatty degeneration in the liver. What substance can be classified as lipotropic?
Correct answer	Choline
B	Triacylglycerides
C	Riboflavin
D	Fatty acids
E	Cholesterol
№	krok 2021
Topic	"Water- and fat-soluble vitamins".
Task	One of the causes of pernicious anemia is disturbed synthesis of transcobalamin –Castle's intrinsic factor -by the parietal cell of the stomach. What substance is called Castle's extrinsic factor?
Correct answer	Cobalamin
B	Folic acid
C	Riboflavin
D	Biotin
E	Pyridoxine
№	krok 2021

Topic	"Water- and fat-soluble vitamins".
Task	A certain natural antioxidant is used in treatment of paradontosis. Which of the listed natural compounds is used as an antioxidant?
Correct answer	Tocopherol
B	Thiamine
C	Choline
D	Pyridoxine
E	Gluconate
№	krok 2021
Topic	Specific ways of amino acid exchange
Task	A 32-year-old man was diagnosed with acute radiation sickness. Laboratory analysis detected a sharp decrease in platelet serotonin levels. The most likely cause of a decrease in platelet serotonin is a disturbed decarboxylation of:
Correct answer	5-Oxytryptophan
B	Tyrosine
C	Histidine
D	Pyruvic acid
E	Serine
№	krok 2021
Topic	Mechanisms of hormones action. Thyroid and parathyroid hormones
Task	A 40-year-old woman during examination presents with intensified basal metabolic rate. Excess in presence of what hormone leads to such condition?
Correct answer	Triiodothyronine
B	Glucagon
C	Somatostatin
D	Thyrocalcitonin
E	Aldosterone
№	krok 2021
Topic	General characteristics of blood
Task	A man presents with decreased blood pH, low levels of bicarbonate ions (a drop in the blood alkaline reserve), and increased blood and urine levels of lactic and pyruvic acids. What type of acid-base imbalance is it?
Correct answer	Metabolic acidosis
B	Metabolic alkalosis
C	Respiratory alkalosis

D	Mixed alkalosis
E	Respiratory acidosis
№	krok 2021
Topic	Functional and clinical biochemistry of muscles, nervous and connective tissues
Task	The patient's blood test shows a significant increase in the activity of the MB-fraction of CPK (creatine phosphokinase) and LDH-1. What pathology can it indicate?
Correct answer	Myocardial infarction
B	Pancreatitis
C	Cholecystitis
D	Hepatitis
E	Rheumatism
№	krok 2021
Topic	Nutritional biochemistry and general characteristics of vitamins
Task	A 63-year-old woman had a gastrointestinal hemorrhage that exposed blood proteins to intestinal microorganisms, i.e. they became a subject of putrefaction It resulted in an increased concentration of the following substance in the patient's blood:
Correct answer	Indole
B	Creatine
C	Globulin
D	Creatinine
E	Albumin
№	krok 2021
Topic	Nutritional biochemistry and general characteristics of vitamins
Task	In the process of human aging, the synthesis and secretion of pancreatic juice decreases and its trypsin levels become- lower, it results in disturbed breakdown of:
Correct answer	Proteins
B	Nucleic acids
C	Phospholipids
D	Polysaccharides
E	Lipids
№	krok 2021
Topic	Hormonal regulation of metabolism

Task	Cushing disease (hyperfunction of the Adrenal cortex with increased production of corticosteroids) leads to the development of hyperglycemia. What process is stimulated in this case?
Correct answer	Gluconeogenesis
B	Krebs cycle
C	Glycogen phosphorolysis
D	Glycolysis
E	Pentose phosphate pathway of glucose oxidation
№	krok 2021
Topic	Classification and mechanism of action of enzymes
Task	In hepatitis and myocardial infarction, the activity of alanine and aspartate" aminotransferases sharply increases in the patients' blood plasma. Why does this increase in the activity of these enzymes in the blood occur?
Correct answer	Damage to cell membranes and release of enzymes into the blood
B	Hormone-induced increase in enzyme activity
C	Amino acid synthesis acceleration in tissues
D	Amino acid breakdown acceleration in tissues
E	Pyridoxine deficiency
№	krok 2021
Topic	Functional and clinical biochemistry of muscles, nervous and connective tissues
Task	A patient with scurvy presents with impaired hydroxylation of collagen proline and lysine. What biochemical process is inhibited in this case, being the reason for this disorder?
Correct answer	Microsomal oxidation
B	Oxidative phosphorylation
C	Tissue respiration
D	Lipid peroxidation
E	Peroxidase oxidation of fats
№	krok 2021
Topic	Catabolism of carbohydrates
Task	A 7-year-old girl has signs of anemia. Laboratory testing determined the deficiency of pyruvate kinase in her erythrocytes. In this case the main role in anemia development belongs to the disturbance of a certain process. What process is disturbed in this girl?
Correct answer	Anaerobic glycolysis
B	Amino acid deamination
C	Oxidative phosphorylation

D	Peroxide decomposition
E	Tissue respiration
№	krok 2021
Topic	General characteristics of blood
Task	A patient with diabetes mellitus developed a diabetic coma because of an acid-base imbalance. What type of imbalance occurred in this case?
Correct answer	Metabolic acidosis
B	Non-gaseous alkalosis
C	Metabolic alkalosis
D	Mixed alkalosis
E	Respiratory acidosis
№	krok 2021
Topic	Transamination and exchange of ammonia
Task	Ammonia is extremely toxic for human CNS. What is the main way of ammonia neutralization in the nervous tissue?
Correct answer	Glutamine synthesis
B	Formation of paired compounds
C	Urea synthesis
D	Transamination
E	Ammonium salts synthesis
№	krok 2021
Topic	Gas exchange mechanisms
Task	In the lungs, an enzyme breaks down carbonic acid ( $H_2CO_A$ ) into water and carbon dioxide that is released with the air. What enzyme catalyzes this reaction?
Correct answer	Carbonic anhydrase
B	Cytochrome oxidase
C	Catalase
D	Peroxidase
E	Cytochrome
№	krok 2021
Topic	Functional and clinical biochemistry of muscles, nervous and connective tissues

Task	A man has asked a cosmetologist to remove a tattoo from his shoulder. What substance, contained in the connective tissue, limits the spread of the dye?
Correct answer	Hyaluronic acid
B	Hyaluronidase
C	Elastin
D	Fibronectin
E	Collagen
№	krok 2021
Topic	Gas exchange mechanisms
Task	Clinical and biochemical examination of a patient revealed sickle cell anemia. Measurement of what blood component was decisive for the diagnosis in this case?
Correct answer	Hemoglobin S
B	Hemoglobin A1
C	Hemoglobin C
D	Hemoglobin F
E	Methemoglobin
№	krok 2021
Topic	Specific ways of amino acid exchange
Task	A patient for a long time v. as on an imbalanced diet low in proteins, which resulted in hepatic fatty infiltration This condition is likely to develop if a certain substance is absent in a person's diet. Name this substance:
Correct answer	Methionine
B	Biotin
C	Acetic acid
D	Alanine
E	Cholesterol
№	krok 2021
Topic	Mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	Mitochondrial respiratory chain contains complex cytochrome' proteins. What type of reactions do they catalyze?
Correct answer	Redox reactions
B	Reactions of transaminatin
C	Reactions of decarboxylatin
D	Reactions of deamination

E	Reactions of hydration
№	krok 2021
Topic	Catabolism of carbohydrates
Task	It has been established that from the same amount of glucose a tumor tissue receives 20-25 times less energy than a healthy cell. This phenomenon indicates the following change in the tumor glucose metabolism:
Correct answer	Intensified anaerobic glycolysis
B	Intensified oxidative processes
C	Normal ratio of the processes
D	Intensified tissue respiration
E	Decreased anaerobic respiration
№	krok 2021
Topic	Nutritional biochemistry and general characteristics of vitamins
Task	After eating fatty foods, the patient develops nausea, heartburn, and steatorrhea. What is the likely cause of this condition?
Correct answer	Bile acid deficiency
B	Amylase deficiency
C	Disturbed phospholipase synthesis
D	Increased lipase production
E	Disturbed trypsin synthesis
№	krok 2021
Topic	Mechanisms of urine formation Pathological components of urine
Task	A man presents with noticeable progressive muscular dystrophy. What indicator of urinary nitrogen metabolism is characteristic of this condition?
Correct answer	Creatine
B	Urea
C	Uric acid
D	Ammonium salts
E	Creatinine
№	krok 2021
Topic	Specific ways of amino acid exchange
Task	An infant presents with colored sclerae and mucous membranes. The infant's urine becomes dark when exposed to air. Homogentisic acid was detected in blood and urine. What disease is likely to be the cause of the infant's condition?
Correct answer	Alcaptonuria

B	Histidinemia
C	Galactosemia
D	Albinism
E	Cystinuria
№	krok 2021
Topic	Specific ways of amino acid exchange
Task	When examining a child, the pediatrician noted that the child presents with delayed physical and mental development. Urinalysis showed an acute increase in the levels of a keto acid that produces a qualitative color reaction with ferric chloride. What metabolic disturbance was detected in this case?
Correct answer	Phenylketonuria
B	Tyrosinemia
C	Albinism
D	Alkaptonuria
E	Cystinuria
№	krok 2021
Topic	Functional and cellular biochemistry of the liver
Task	A bite of a venomous snake can provoke hemolytic jaundice in a person. What blood plasma value would be the first to increase in a bitten person?
Correct answer	Indirect (unconjugated) bilirubin
B	Direct (conjugated) bilirubin
C	Free amino acids
D	Urea
E	Uric acid
№	krok 2021
Topic	Mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	The process of tissue respiration is accompanied by oxidation of organic compounds and synthesis of macroergic molecules. In what organelles does this process occur?
Correct answer	Mitochondria
B	Ribosomes
C	Golgi apparatus
D	Peroxisomes
E	Mitochondria



№	krok 2021
Topic	Nucleic acid exchange. Protein synthesis
Task	The initiation of transcription process becomes possible when an enzyme DNA- dependent RNA polymerase attaches to a certain segment of DNA molecule. Name this DNA segment:
Correct answer	Promoter
B	Terminator
C	Regulator
D	Repressor
E	Suppressor
№	krok 2021
Topic	Characteristics and intracellular lipid metabolism
Task	A person has been bitten by a snake, which led to asphyxia and hemoglobin in urine. Erythrocyte hemolysis occurs in blood. Toxic snake venom causes:
Correct answer	Lysolecithin formation
B	Alkalosis development
C	Acidosis
D	Polyuria
E	Triglyceride formation
№	krok 2021
Topic	Mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	When a dentist applied hydrogen peroxide to the patient's oral mucosa, it started frothing excessively. What enzyme breaks down hydrogen peroxide?
Correct answer	Catalase
B	Methemoglobin reductase
C	Acetyltransferase
D	Glucose-6-phosphate dehydrogenase
E	Cholinesterase
№	krok 2021
Topic	Water- and fat-soluble vitamins".
Task	Wernicke-Korsakoff syndrome often develops in chronic alcoholics, who have a low-vitamin diet. Decreased transketolase activity can be observed in the course of this disease. What vitamin deficiency causes this development?
Correct answer	Thiamine

B	Riboflavin
C	Retinol
D	Cobalamin
E	Niacin
№	krok 2021
Topic	Catabolism of carbohydrates
Task	In von Gierke disease, glycogen accumulation can be observed in liver and kidneys. This disease is caused by deficiency of the following enzyme:
Correct answer	Glucose-6-phosphatase
B	Phosphoglucomutase
C	Glucokinase
D	Glycogen phosphorylase
E	Phosphorylase kinase
№	krok 2021
Topic	Nutritional biochemistry and general characteristics of vitamins
Task	A patient was brought by an ambulance to the inpatient department. He was provisionally diagnosed with acute pancreatitis. To confirm this diagnosis, it is necessary to measure the activity of a certain enzyme in the patient's blood and urine. Name this enzyme:
Correct answer	Alpha-amylase
B	Choline esterase
C	Aspartate transaminase
D	Lactate dehydrogenase
E	Alanine transaminase
№	krok 2021
Topic	Functional and clinical biochemistry of muscles, nervous and connective tissues
Task	A patient with myocardial infarction in the acute phase has been hospitalized into the cardiology unit. To induce platelet lysis in the patient's coronary vessels, the following enzyme should be used during the early hours of infarction:
Correct answer	Streptokinase
B	Lysozyme
C	Trypsin
D	Lydase (Hyaluronidase)
E	Chymotrypsin
№	krok 2021

Topic	Transamination and exchange of ammonia
Task	A 3-year-old child after a past case of severe viral infection presents with recurrent vomiting, loss of consciousness, and seizures. Blood testing reveals hyperammonemia. What is the likely cause of such changes in the biochemical parameters of the child's blood?
Correct answer	Disturbed ammonia neutralization in the ornithine cycle
B	Disturbed ammonia neutralization in the Krebs cycle
C	Activation of amino acid decarboxylation processes
D	Increased putrefaction of proteins in the intestine
E	Disturbed neutralization of biogenic amines
№	krok 2021
Topic	Mechanisms of hormones action. Thyroid and parathyroid hormones
Task	Tyrosine is used as a substrate in thyroxine synthesis. What chemical element takes part in this process?
Correct answer	Iodine
B	Copper
C	Calcium
D	Zinc
E	Iron
№	krok 2021
Topic	Mechanism of tissue respiration. Peroxide and microsomal oxidation
Task	Name the supramolecular multienzyme complex that is integrated into the lipid layer of inner mitochondrial membrane that creates conditions for redox reactions:
Correct answer	Respiratory chain
B	Carboxypeptidase
C	G-protein transducer
D	Pyruvate kinase
E	Hexokinase
№	krok 2021
Topic	Mechanisms of hormones action. Thyroid and parathyroid hormones
Task	During mental stress a hormonesensitive enzyme triacylglycerol lipase activates in fatty tissues. What secondary messenger takes part in activation of this enzyme?
Correct answer	Cyclic adenosine monophosphate
B	Cyclic guanosine monophosphate
C	Inositol triphosphate

D	Ca <sup>2+</sup>
E	Diacylglycerol
№	krok 2021
Topic	Specific ways of amino acid exchange
Task	Albinos are vulnerable to sunlight - instead of developing a suntan, they develop burns. This phenomenon occurs because of disturbed metabolism of a certain amino acid. Name this amino acid:
Correct answer	Phenylalanine
B	Tryptophan
C	Methionine
D	Histidine
E	Glutamine
№	krok 2021
Topic	Gas exchange mechanisms
Task	Lung pathologies stimulate adaptive changes in the human body to ensure better oxygen supply to the tissues. One of these adaptive changes is the increased synthesis of the following in the erythrocytes:
Correct answer	2,3-diphosphoglycerate
B	Fructose-1,6-diphosphate
C	1,3-diphosphoglycerate
D	Glucose-6-phosphate
E	3-phosphoglycerate
№	krok 2021
Topic	Functional and cellular biochemistry of the liver
Task	Liver diseases usually are accompanied by a marked tendency to bleed. Why is it so?
Correct answer	Decreased synthesis of prothrombin and fibrinogen
B	Decreased blood levels of potassium
C	Disturbed pigment metabolism
D	Decreased synthesis of bile acids
E	Increased breakdown of coagulation factors
№	krok 2021
Topic	"Water- and fat-soluble vitamins".

Task	A newborn had seizures that stopped after vitamin B <sub>6</sub> was prescribed. This effect was most likely observed, because vitamin B <sub>6</sub> takes part in formation of:
Correct answer	Gamma-aminobutyric acid (GABA)
B	Heme
C	Histamine
D	Non-essential amino acids
E	Nicotinamide
№	krok 2021
Topic	Nucleic acid exchange. Protein synthesis
Task	A man is a carrier of AIDS virus that is an RNA virus. The cells of this patient synthesize viral DNA, This process is based on:
Correct answer	Reverse transcription
B	Repair
C	Translation
D	Transcription
E	Replication
№	krok 2021
Topic	Mechanisms of hormones action. Thyroid and parathyroid hormones
Task	A child has signs of delayed physical and mental development (cretinism). This condition is caused by deficiency of the following hormone:
Correct answer	Thyroxine
B	Calcitonin
C	Somatotropin
D	Insulin
E	Testosterone
№	krok 2021
Topic	Mechanisms of urine formation Pathological components of urine
Task	A patient suffers from disturbed renal function. To check the filtration ability of the kidneys, he was referred for clearance measurement of the following substance:
Correct answer	Creatinine
B	Glutamine
C	Indole

D	Hydrogen carbonate
E	Uric acid
№	krok 2021
Topic	Nucleic acid exchange. Protein synthesis
Task	Watson and Crick determined that the DNA double helix structure is stabilized with the bonds between complementary nitrogenous bases. What type of bond is it?
Correct answer	Hydrogen
B	Phosphodiester
C	N-glycosidic
D	Ester
E	Peptide
№	krok 2021
Topic	Functional and clinical biochemistry of muscles, nervous and connective tissues
Task	Collagenosis patients typically present with connective tissue destruction processes. The presence of these processes can be confirmed by the increase in:
Correct answer	Blood oxyproline and oxylysine
B	Blood creatine and creatinine
C	Blood urates
D	Transaminase activity in the blood
E	LDH-isoenzymc activity in the the blood