GOVERNMENT NONPROFIT COMPANY «CENTER OF EDUCATION QUALITY OF THE MINISTRY OF HEALTH OF UKRAINE»

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TEST ITEMS FOR THE UNIFIED STATE QUALIFICATION EXAM

STAGE 1

ENGLISH LANGUAGE PROFICIENCY TEST

Specialty «MEDICINE»

I. Read the text and answer 10 questions to it.

Regenerative medicine

Organ transplantation is often hindered by organ availability and the problem of tissue rejection. The relatively new science of "regenerating"human cells and tissues aims to overcome such obstacles, paving the way for growing organs to order.

In 2006, Japanese researcher Shinya Yamanaka made the crucial discovery that multipotent stem cells (those with the capacity to develop into a range of specialized cell types within a specific organ) can be reprogrammed to become pluripotent cells (those with the potential to grow into any cell type). Yamanaka's vital work reversed the development of multipotent cells, turning them back into immature cells with the potential to grow into a range of different body cells.

In 2015, using the techniques pioneered by Yamanaka, researchers working at Heriot-Watt University in Edinburgh, Scotland, developed a 3D printing process that can print human stem cells derived from a donor's own tissue. This paved the way for making laboratory-grown human tissue available for wider use, both in transplantation and in pharmaceutical research.

Brazilian researchers in 2019 reprogrammed human blood cells to form hepatic organoids, in effect "mini livers"to mimic the functions of a normal liver, such as storing vitamins, producing enzymes, and secreting bile. Only miniature livers have been produced so far, but the technique could be used to produce entire organs for transplantation.

1. Why is using a donor's own tissue important in 3D printing?

A. It improves organ size
B. It lowers the risk of rejection
C. It reduces cost
D. It speeds up printing

2. What technology was developed at Heriot-Watt University in 2015?

A. 3D printing of human stem cells
B. Artificial blood production
C. Organ cloning machines
D. Gene-editing tools

3. What is a potential future application of these technologies?

A. Growing full organs for transplantation
B. Making humans live forever
C. Eliminating all diseases
D. Replacing doctors in surgery

4. The text states that fully functional human organs have already been successfully grown and transplanted.

A. Not Given
B. True
C. False

5. What did Shinya Yamanaka discover in 2006?

A. How to clone human organs
B. How to grow organs in animals
C. How to transplant organs successfully
D. How to reprogram multipotent cells into pluripotent cells

6. What are pluripotent stem cells capable of doing?

A. Developing into any type of cell in the body
B. Repairing damaged tissues directly
C. Producing only blood cells
D. Replacing only liver cells

7. Yamanaka's discovery made it possible to turn mature cells back into immature cells.

A. True
B. Not Given
C. False

8. What is one major problem with organ transplantation?

A. High cost of surgery
B. Long recovery time
C. Lack of trained doctors
D. Limited organ availability and tissue rejection

9. The mini livers created by Brazilian researchers can perform all functions of a natural liver.

A. True
B. Not Given
C. False

10. What did Brazilian researchers create in 2019?

A. Brain tissue models
B. Synthetic kidneys
C. Artificial hearts
D. Hepatic organoids (mini livers)

II. Choose the right answer.

11. A patient, who has been taking betamethasone for a long time to treat bronchial asthma, started taking nonsteroidal anti-inflammatory drugs (NSAIDs) without consulting a doctor. After a while, he developed gastric bleeding caused by a stomach ulcer. What drug has most likely caused this complication?

A. Prednisolone
B. Celecoxib
C. Paracetamol
D. Diclofenac sodium
E. Drotaverine

12. A 69-year-old patient complained of periodic pain under her left scapula and in her left shoulder. After significant physical exertion, the pain sharply intensified. ECG allowed diagnosing her with an acute myocardial infarction. What type of pain has occurred in this case?

A. Psychogenic pain
B. Radiating pain
C. Causalgic pain
D. Phanton pain
E. Recurrent pain

13. An endocrinologist has diagnosed a woman with exophthalmos, eyelid tremor, increased sweating, and tachycardia. These symptoms are likely to accompany a pathology of a certain endocrine gland. Name this gland.

A. Pineal gland
B. Ovaries
C. Pancreas
D. Thyroid gland
E. Adrenal glands

14. A 55-year-old man diagnosed with radiation sickness has been hospitalized into the intensive care unit with signs of hemorrhagic syndrome. What changes in the laboratory findings are the main ones in the pathogenesis of this pathological condition?

A. Lymphopenia
B. Neutropenia
C. Eosinopenia
D. Erythropenia
E. Thrombocytopenia

15. Under anaerobic conditions, the breakdown of a glucose molecule has resulted in the formation of two lactate molecules and two ATP molecules. What is this process called?

A. Glycogenolysis
B. Hydrolysis
C. Glycolysis
D. Gluconeogenesis
E. Glycogenesis

16. tRNA is an important component of the protein-synthesizing system that functions as an adapter. The interaction between a tRNA and its corresponding amino acid requires their mutual recognition and subsequent attachment, which is catalyzed by:

A. Peptidyl ttransferase
B. RNA polymerase
C. Aminoacyl-tRNA synthetase
D. Aminoacyl-mRNA synthetase
E. Aminoacyl-tRNA transferase

17. A teenager with delayed sexual development, gynecomastia, and long limbs came to a medical geneticist. Analysis of the epithelial cells from the patient's oral cavity detects Barr bodies. What syndrome can be indicated by this finding?

A. "Superfemale" syndrome (trisomy X)
B. Edwards syndrome
C. Patau syndrome
D. Hashimoto disease
E. Klinefelter syndrome

18. A 30-year-old woman visits her doctor for a routine check-up. During the examination, she presents with a slight change in the shape and position of her auricles, an abnormal curvature of her fifth finger, a high-arched palate, and abnormal tooth growth. Her reproductive function is not impaired. The patient has been provisionally diagnosed with "superfemale" syndrome. What karyotype is characteristic of this pathology?

A. (47, YYY)
B. (47, XYY)
C. (45, X0)
D. (47, XXY)
E. (47, XXX)

19. A patient with severe dehydratation due to vomiting and diarrhea, lasting over the past several days, has been admitted to the infectious diseases unit of a hospital. What change should be expected in the patient's cardiovascular system?

A. Decreased cardiac output
B. Increased central venous pressure
C. Dilatation of the jugular veins
D. Increased blood flow in the capillary bed
E. Increased arterial blood pressure

20. A child with impaired immune response underwent an examination to assess antigen-independent proliferation and differentiation of T-lymphocytes. For this test, a biopsy sample must be obtained from a certain organ. Name this organ.

A. Spleen
B. Thymus
C. Palatine tonsil
D. Lymph node
E. Red bone marrow

21. During the examination of a newborn, the doctor diagnosed the baby with congenital muscular torticollis. What neck muscle is affected in this case?

A. *M. sternohyoideus*
B. *M. sternocleidomastoideus*
C. *M. omohyoideus*
D. *M. mylohyoideus*
E. *M. platysma*

22. After eating salt-rich foods, a patient experiences thirst due to an increase in blood plasma osmolarity. What hormone secretion will increase in response to this?

A. Thyrocalcitonin
B. Vasopressin
C. Aldosterone
D. Atrial natriuretic peptide
E. Renin

23. A child inhaled a button that was later removed from the right main bronchus using a bronchoscope. What bronchial epithelium is most likely to be damaged there by such a foreign body?

A. Non-keratinized stratified epithelium
B. Simple squamous epithelium
C. Ciliated pseudostratified epithelium
D. Transitional epithelium
E. Simple low columnar epithelium

24. Autopsy of the body reveals a large dense gray area in the myocardium. Histologically, it consists of coarse fibrous connective tissue surrounded by hypertrophied muscle fibers. What changes developed in the heart?

A. Diffuse small focal cardiosclerosis
B. Ischemic stage of myocardial infarction
C. Postinfarction large focal cardiosclerosis
D. Myocarditis
E. Necrotic stage of myocardial infarction

25. What regulatory mechanisms increase the heart rate, when the body's position changes from horizontal to vertical?

A. Catecholamines
B. Unconditioned sympathetic reflexes
C. Sympathetic reflexes and catecholamines
D. Conditioned and unconditioned sympathetic reflexes
E. Conditioned sympathetic reflexes

26. On the fifth day of life, a newborn baby developed skin lesions that allowed diagnosing the baby with the development of scalded skin syndrome (Ritter's disease). What microorganism has caused this condition in the baby?

A. Measles virus
B. *Staphylococcus*
C. *Streptococcus*
D. Herpes simplex virus
E. *Proteus*

27. As a result of an accident, a person sustained a spinal injury. Damage to the spinal cord is suspected. Damage to the I–II sacral segments of the spinal cord can be identified if a certain reflex is impaired. Name this reflex.

A. Elbow flexor reflex of the forearm
B. Achilles tendon reflex
C. Extensor reflex of the forearm
D. Positive support reflex
E. Patellar (knee-jerk) reflex

28. To treat the inflammatory process in the vascular layer of the eye (uveitis), it is necessary to dilate the pupil. For this purpose, the patient has been prescribed phenylephrine. What group of drugs can amplify the mydriatic effect of this drug?

A. Muscarinic agonists
B. Myotropic antispasmodics
C. Muscarinic antagonists
D. –
E. Non-steroidal anti-inflammatory drugs

29. Matrix mutations disrupt the binding of RNA polymerases. What process will be impaired as a result?

A. DNA replication
B. pre-mRNA processing
C. Nucleotide synthesis
D. DNA repair
E. Initiation of transcription

30. A man developed prolonged suppuration of a wound after an injury to the limb. His death occurred with signs of severe intoxication. Autopsy of the body reveals multiple small abscesses in the lungs, kidneys, and myocardium. Hyperplasia of the spleen with numerous neutrophils in its sinuses can be observed. What clinical and morphological form of sepsis is it?

A. Septic endocarditis
B. Septicopyemia
C. Septicemia
D. Chronic sepsis
E. –

31. A woman died suddenly at week 34 of her pregnancy during a seizure episode. Autopsy and histology of the necropsy material detect edema and intracerebral hemorrhage. The liver is variegated due to dystrophic changes and necrosis of hepatocytes. The kidneys are enlarged and variegated, with microscopic signs typical of membranous glomerulonephritis. Dystrophy and ischemic necrosis of

cardiomyocytes are observed in the myocardium. What disease can be characterized by such changes?

A. Eclampsia
B. Hepatosis
C. Ischemic stroke
D. Myocardial infarction
E. Chronic glomerulonephritis

32. A material was taken from the pharynx and nose of a child with acute tonsillitis. When cultured on egg-yolk salt agar, the isolated culture formed opaque, round, smooth yellow colonies surrounded by an iridescent halo. The coagulase test was positive. What microorganism was isolated in this case?

A. *S. aureus*
B. *S. viridans*
C. *S. pyogenes*
D. *S. haemolyticus*
E. *S. epidermidis*

33. Autopsy of the body has revealed over 200 small helminths 4–13 mm in size in the liver. They have two suckers at the anterior end of the body and two branched testes at the posterior end. What pathological diagnosis will the doctor make in this case?

A. Dicrocoeliasis
B. Schistosomiasis
C. Fascioliasis
D. Opisthorchiasis
E. Paragonimiasis

34. A blood smear shows a large round cell with slightly basophilic cytoplasm, containing varying numbers of very fine azurophilic granules. The nucleus is pale and bean-shaped. The chromatin is present in the form of fine granules, dispersed throughout the nucleus. Identify this blood cell.

A. Neutrophil
B. Lymphocyte
C. Eosinophil
D. Platelet
E. Monocyte

35. Examination of a 5-year-old child with a hereditary kidney disorder has detected signs of rickets, though the child's laboratory tests show normal vitamin D levels. What is the most likely cause of rickets in this case?

A. Insufficient calcium intake with food
B. Hypoparathyroidism
C. Hyperparathyroidism
D. Impaired calcitriol synthesis
E. Increased calcium excretion

36. A patient with a penetrating injury to the anterior abdominal wall presents with damage to the mesentery of the intestine that limits *sinus mesentericus dexter* from above. Name this intestine.

A. *Colon transversum*
B. *Jejunum*
C. *Duodenum*
D. *Colon sigmoideum*
E. *Ileum*

37. Along with the general pathways of amino acid metabolism, some amino acids also have their specific metabolic pathways. Impaired metabolism of a certain amino acid can result in decreased synthesis of melanin, catecholamines, and thyroid hormones. Name this amino acid.

A. Phenylalanine
B. Tryptophan
C. Valine, leucine, isoleucine
D. Histidine
E. Sulfur-containing amino acids

38. A 52-year-old patient with rheumatoid arthritis was taking diclofenac sodium capsules. After a while, he began experiencing

epigastric pain and discomfort, nausea, and dyspeptic disorders. What mechanism of action of the drug has resulted in this complication?

A. Inhibition of lipoxygenase
B. Inhibition of cyclooxygenase-1 (COX-1) in the gastric mucosa
C. Inhibition of creatine phosphokinase
D. Inhibition of phosphodiesterase
E. Inhibition of cyclooxygenase-2 (COX-2)

39. The blood test of a child, who was fed cow's milk formula, detects severe anemia: erythrocytes — $4 \cdot 10^{12}$/L, hemoglobin — 65 g/L, reticulocytes — 0.1%. What type of anemia has developed in the child?

A. Posthemorrhagic anemia
B. Iron deficiency anemia
C. Hemolytic anemia
D. B_{12} and folate deficiency anemia
E. Hypoplastic anemia

40. A 26-year-old man came to an endocrinologist. Objectively, his height is 120 cm, he has proportional built and his mental development is normal. These signs are characteristic of insufficient synthesis of a certain hormone during his childhood years. Name this hormone.

A. Adrenocorticotropic hormone
B. Somatotropin
C. Gonadotropin
D. Thyrotropin
E. Thyroxine

41. A 45-year-old patient has been hospitalized with the diagnosis of pneumonia. His test results reveal that the infection has been caused by *Mycoplasma pneumoniae*. What group of bacteriostatic drugs should be prescribed to the patient in this case?

A. Macrolides
B. Penicillins
C. Aminoglycosides
D. Cephalosporins
E. Fluoroquinolones

42. When performing right-sided lobectomy, the surgeon operates near the root of the right lung to isolate its structures. List the elements of the root of the right lung in their order from top to bottom.

A. Bronchus, pulmonary artery, phrenic nerve
B. Pulmonary artery, bronchus, pulmonary veins
C. Phrenic nerve, bronchus, bronchial artery and bronchial vein
D. Pulmonary vein, pulmonary artery, bronchus
E. Bronchus, pulmonary artery, pulmonary veins

43. When morphine is discontinued after its long-term use, it can result in severe mental, neurological, and somatic disorders. What is the name of this pathological condition?

A. Idiosyncrasy
B. Withdrawal
C. Cumulation
D. Tolerance
E. Sensitization

44. A patient with burns that cover up to 60% of the surface of his body received a skin graft. Three weeks after the surgery, transplant rejection is observed. What cells are involved the most in this pathological process?

A. Plasma cells
B. B-lymphocytes
C. T-lymphocytes
D. Basophils
E. Eosinophils

45. A patient with gastritis complains of sour belching and

frequent constipations. Titration of the patient's gastric juice reveals increased levels of hydrochloric acid. Assess the acidity of the patient's gastric juice.

A. Achylic
B. Hypoacidic
C. Anacidic
D. Normacidic
E. Hyperacidic

46. A man who has sustained an eye injury when working at a factory came to the emergency unit of a hospital. After examining the patient, the doctor concluded that the external fibrous tunic of the eyeball was damaged. What structure of the eye has been damaged in this case?

A. *Pupilla*
B. *Iris*
C. *Retina*
D. *Lens*
E. *Cornea*

47. To determine the leukocyte differential count, a blood smear must be prepared. What staining method should be used for this purpose?

A. Orcein stain
B. Iron hematoxylin stain
C. Romanowsky-Giemsa stain
D. Sudan stain
E. Congo red stain

48. A 45-year-old woman has developed a pigmented formation in the form of a nodule on the skin of her face. Microscopically, fields of spindle-shaped and polymorphic cells, containing a brown pigment and undergoing a large number of mitoses, were detected in the biopsy material. What pathological condition has developed in the patient?

A. Papilloma
B. Melanoma
C. Cancer
D. Pigmented nevus
E. Dermatofibroma

49. A 25-year-old red-haired patient noticed enlargement and inflammatory changes around a nervus on his right shin after intense sun explosure. Examination of the biopsy specimen allowed establishing the diagnosis of nodular melanoma. The tumor was removed together with the adjacent tissues. What pigment is a marker of the histogenetic origin of this tumor?

A. Melanin
B. Lipofuscin
C. Hematin
D. Porphyrin
E. Hemosiderin

50. A patient complains of being unable to raise his right arm above the horizontal level. Examination detects winging of the medial border of his right scapula. What muscle is dysfunctional in this case?

A. Teres major
B. Serratus anterior
C. Teres minor
D. Trapezius
E. Deltoid