STATE NON-PROFIT ENTERPRISE
«TESTING BOARD FOR PROFESSIONAL COMPETENCE ASSESSMENT OF HIGHER EDUCATION TRAINEES IN MEDICINE AND PHARMACY AT THE MINISTRY OF HEALTH OF UKRAINE»

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Variant 62

TEST ITEMS
FOR THE UNIFIED STATE QUALIFICATION EXAM
TEST COMPONENT
STAGE 1

PHARMACY, INDUSTRIAL PHARMACY

ENGLISH LANGUAGE PROFICIENCY TEST

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

Plague

Naturally acquired plague most commonly manifests in the bubonic form, with acute onset of fever and painful swollen regional lymph nodes (buboes). Less commonly, plague manifests in the septicemic form or as pneumonic plague, and, rarely, as meningeal, pharyngeal, ocular, or gastrointestinal plague. Abrupt onset of fever, chills, headache, and malaise are characteristic in all cases. Occasionally, patients have symptoms of mild lymphadenitis or prominent gastrointestinal tract symptoms, which may obscure the correct diagnosis.

When left untreated, plague will often progress to overwhelming sepsis with renal failure, acute respiratory distress syndrome, instability, diffuse intravascular coagulation, necrosis of distal extremities, and death.

Plague is caused by Yersinia pestis, a pleomorphic, bipolar-staining, gram-negative coccobacillus.

Plague is a zoonotic infection primarily maintained in rodents and their fleas. Humans are incidental hosts who typically develop bubonic or primary septicemic manifestations through the bite of infected rodent fleas or direct contact with tissues of infected animals. Secondary pneumonic plague arises from hematogenous seeding of the lungs with Y pestis in patients with untreated bubonic or septicemic plague. Primary pneumonic plague is acquired by inhalation of respiratory tract droplets from a human or animal with pneumonic plague. Only the pneumonic form has been shown to be transmitted from person to person, and the last known case of person-to-person transmission in the United States occurred in 1924. Rarely, humans can develop primary pneumonic plague following exposure to domestic cats with respiratory tract plague infections. Plague occurs worldwide with enzootic foci in parts of Asia, Africa, and the Americas. Most human plague cases are reported from rural, underdeveloped areas and mainly occur as isolated cases or in small, focal clusters. Since 2000, more than 95% of the approximately 22,000 cases reported to the World Health Organization have been from countries in sub-Saharan Africa.

1. Choose the correct statement.

A. Plague occurs only in Asia and Africa
B. Plague most often occurs in the USA
C. Plague can occur only in African countries
D. Plague occurs all over the world

2. A plague is a severe illness and can often lead to death.

A. True
B. False
C. Not given

3. Can the plague be transmitted from person to person?

A. Yes, it's main way to its spreading
B. Yes, but it's rare
C. It is still unknown
D. No, it can never be the case

4. How does secondary pneumonic plague occur?

A. Due to hematogenous seeding of the lungs with Y pestis in patients with untreated other forms of plague
B. Due to untreated primary pneumonic plague
C. Due to inhalation of respiratory tract droplets from a human or animal with pneumonic plague
D. Due to hematogenous seeding of the lungs with Y pestis in patients with respiratory diseases

5. What is the most common way of plague transmission?

A. Haematogenic transmission
B. Person-to-person transmission
C. Inhalation of respiratory tract droplets from an animal with plague
D. Through the bite of infected rodent fleas or direct contact with tissues of infected animals

6. Choose the correct statement.

A. Only animals can have a plague
B. Animals are main hosts of Yersinia pestis
C. Both animals and humans can be the main hosts of Yersinia pestis
D. Animals are incidental hosts of Yersinia pestis

7. The rarest form of plague is meningeal.

A. True
B. False
C. Not given

8. Most cases of plague are happening in big city centres.

A. True
B. False
C. Not given

9. Bubonic plague is the most common form of plague.

A. True
B. False
C. Not given

10. What are buboes?

A. The pathognomonic type of fever
B. The pathognomonic rash
C. The type of cells that are found in the blood
D. The lymph nodes that are swollen

II. Choose the right answer.

11. The main mechanism of ammonia neutralization in the body is the biosynthesis of urea. The cycle of urea synthesis begins with the formation of a certain high-energy compound. What high-energy compound is it?

A. Argininosuccinate
B. Fumaric acid
C. Carbamoyl phosphate
D. Arginine
E. Citrulline

12. What physico-chemical method is used to determine the pH of solutions for injections?

A. Conductometry
B. Amperometry
C. Polarography
D. Potentiometry
E. Electrolysis

13. What drug should be prescribed to a patient with bronchospasm?

A. Bisacodyl
B. Salbutamol
C. Oxytocin
D. Insulin
E. Vicasol (Menadione)

14. Vitamins can enhance each other's effects, when taken simultaneously. What vitamin potentiates the activity of vitamin *P*?

A. B_2
B. B_1
C. *D*
D. C
E. A

15. A man has undergone a course of radiotherapy and chemotherapy. The drug complex included 5-fluorodeoxyuridine that is an inhibitor of thymidylate synthase. This drug blocks the synthesis of a certain substance. What substance is it?

A. Protein
B. tRNA
C. mRNA
D. DNA
E. rRNA

16. In the process of creating vaccines, pathogens of infectious diseases are being attenuated. What is the essence of the attenuation process?

A. Isolation of protective antigens from microbial cells
B. Inactivation of pathogens while preserving the antigenic structure of cells
C. Reduction of immunogenicity of the pathogen
D. Discovering antigenic determinants of the main antigens of the pathogen
E. Artificial reduction of virulent properties of pathogens

17. What indicator is used, when sodium carbonate is being quantified in the preparation by means of acid-base titration?

A. Diphenylamine
B. Methylene blue
C. Ferroin
D. Methyl orange
E. Murexide

18. What substances can be determined by means of substitution titration using the iodometric method?

A. Unsaturated hydrocarbons
B. Strong oxidizing agents
C. Saturated hydrocarbons
D. Strong reducing agents
E. Weak reducing agents

19. Helmholtz energy is the direction criterion of an arbitrary process at a constant:

A. Entropy and pressure
B. Temperature and pressure
C. Internal energy and volume
D. Entropy and volume
E. Temperature and volume

20. What reaction occurs according to the free-radical (SR) mechanism?

A. $C_6H_6 + Cl_2$
B. $CH_3CH_2OH + HCl$
C. $C_2H_6 + Cl_2$
D. $CH_3{-}CH_3 + O_2$
E. $CH_2 = CH_2 + Cl_2$

21. To preserve valuable varietal qualities of peppermint, the optimal method of its propagation was chosen. What method is it?

A. Parts of the tuber
B. Parts of the rhizome
C. Plantlets
D. Germinated seeds
E. Leaf cuttings

22. During the assessment of air purity in an aseptic unit of a phamacy, sedimentation analysis resulted in growth of small colonies with areas of hemolysis. What medium was used for inoculation in this case?

A. Endo agar
B. Blood agar
C. Egg-yolk salt agar
D. Levine formulation (eosin methylene blue agar)
E. Ploskirev agar

23. Proteins are the catalysts of biochemical processes. What type of homogeneous catalysis includes the processes with their participation?

A. Redox catalysis
B. Coordination catalysis
C. Enzyme catalysis
D. Acid-base catalysis
E. Gas-phase homogeneous catalysis

24. Coumarins, vitamin K antagonists, suppress the processes of blood coagulation. Synthesis of what protein is blocked by coumarins?

A. Transferrin
B. Gamma globulin
C. Ceruloplasmin
D. Prothrombin
E. Albumin

25. What reference electrode can be used in the potentiometric analysis of a medicinal substance?

A. Zinc electrode
B. Glass electrode
C. Silver chloride electrode
D. Quinhydrone electrode
E. Antimony electrode

26. To what electrode will a protein particle move during electrophoresis, if its isoelectric point is 4.0 and the pH of the solution is 5.0?

A. To the cathode
B. Will not move anywhere
C. To the anode
D. First to the cathode and then to the anode
E. First to the anode and then to the cathode

27. A patient with an acute myocardial infarction had been receiving heparin as a component of complex therapy. After a time, the patient developed hematuria. What drug is indicated as an antidote to heparin?

A. Protamine sulfate
B. Vicasol (Menadione)
C. Aminocaproic acid
D. Fibrinogen
E. Neodicoumarin (ethyl biscoumacetate)

28. A man has a nitrate poisoning. What type of hypoxia will develop in this case?

A. Respiratory hypoxia
B. Hemic hypoxia
C. Tissue hypoxia
D. Circulatory hypoxia
E. Hypoxic hypoxia

29. In what pair of substances the both of them form a precipitate of metallic silver when Tollens reagent is added (during heating)?

A. Ethanol and formic acid
B. Propanol and formic acid
C. Propanal and formic acid
D. Propanal and acetic acid
E. Acetic acid and formic acid

30. There are certain patterns of chemical and biological processes occurring with the drug in the body. Reduced absorption of tetracycline when it is co-administered with antacids is an example of:

A. Pharmaceutical incompatibility
B. Synergism
C. Pharmacokinetic incompatibility
D. Pharmacodynamic incompatibility
E. Functional antagonism

31. A patient complains of loss of appetite, weight loss, weakness, and abdominal pain. Laboratory blood test shows the following: Hb — 90 g/L; erythrocytes — $2.0 \cdot 10^{12}$/L; color index — 1.4. B_12 deficiency anemia has been diagnosed. What substance is deficient in this patient, causing the anemia?

A. Hydrochloric acid
B. Renin
C. Castle factor
D. Secretin
E. Pepsin

32. In the roots of primary structure, the nutrient reserves are stored in the:

A. Endodermis
B. Mesodermis
C. Pericycle
D. Central axial cylinder
E. Exodermis

33. What drug is a non-selective beta-blocker?

A. Anaprilin (Propranolol)
B. Prozerin (Neostigmine)
C. Metoprolol
D. Atropine
E. Adrenaline hydrochloride

34. In redox titrimetry, the indicators that are added to the reaction system respond to the changes in the:

A. Concentration of hydroxyl ions
B. Concentration of hydrogen ions
C. Ionic strength of the solution
D. Degree of ionization of the substance being analyzed
E. Redox potential of the system

35. The fruit is a bright-red juicy follicetum with a sweet-sour taste. Its seeds are kidney-shaped and smell similar to lemon. Such fruits belong to:

A. *Malus domestica*
B. *Citrus limon*
C. *Schisandra chinensis*
D. *Sorbus aucuparia*
E. *Viburnum opulus*

36. The presence of antibodies to HIV has been established in the analyzed serum by means of enzyme-linked immunosorbent assay. What method or reaction must be used to confirm the diagnosis of AIDS?

A. Immunofluorescence
B. Immunoblotting
C. Bacteriological method
D. Biological method
E. Virological method

37. A patient with gout has been prescribed allopurinol. What is the mechanism of action of this drug?

A. Stimulation of uric acid breakdown
B. Activation of microsomal oxidation in the liver
C. Inhibition of COX-2 enzyme
D. Intensification of uric acid excretion by the kidneys
E. Inhibition of xanthine oxidase enzyme, inhibition of uric acid synthesis

38. The type of bacterial respiration is of great importance for the growth and reproduction of bacteria. Some species are unable to reproduce in the presence of oxygen and use sulfate respiration. What are these microorganisms called?

A. Facultative anaerobes
B. Obligate anaerobes
C. Microaerophiles
D. Macroaerophiles
E. Obligate aerobes

39. For tetanus prevention, a toxin that has been neutralized with formalin (0.4%) at the temperature of $39^{o}C$ for four weeks is used. What kind of preparation is it?

A. Anatoxin
B. Inactivated vaccine
C. Antitoxic serum
D. Immunoglobulin
E. Adjuvant

40. In medicine and pharmacy, such phenomena as adsorption, wetting, adhesion, etc. can be observed. What are they called?

A. Physico-chemical phenomena
B. Electrokinetic phenomena
C. Molecular-kinetic phenomena
D. Optical phenomena
E. Superficial phenomena

41. How many stereoisomeric aldohexoses exist?

A. 16
B. 6
C. 8
D. 2
E. 4

42. People, who were indoors during a fire, suffer from a carbon monoxide poisoning. What type of hypoxia is observed in such cases?

A. Tissue hypoxia
B. Hypoxic hypoxia
C. Hemic hypoxia
D. Circulatory hypoxia
E. Respiratory hypoxia

43. What is the final product, obtained as a result of heating bromoethane with an aqueous solution of potassium hydroxide?

$H_3C - CH_2 - Br + KOH \xrightarrow{H_2O} ?$

A. Ethene
B. Ethanoic acid
C. Ethane
D. Diethyl ether
E. Ethanol

44. After eating strawberries, a child developed itchy red spots on the skin (urticaria). What type of leukocytosis would be detected in this child?

A. Monocytic
B. Lymphocytic
C. Neutrophilic
D. Basophilic
E. Eosinophilic

45. In the process of asexual reproduction, higher spore-forming plants have the ability to form spores, which is an adaptation to life on dry land. What set of chromosomes do their spores have?

A. Diploid
B. Triploid
C. Haploid
D. Polyploid
E. Tetraploid

46. What reagent can be used to distinguish maltose (a reducing disaccharide) from sucrose (a non-reducing disaccharide)?

A. Br_2
B. $NaOH$
C. $K_4[Fe(CN_6)]$
D. Tollens reagent
E. $FeCl_3$

47. A student studies the digestive system of vertebrates. The organ that is being studied is primarily located in the right upper quadrant of the abdomen. It detoxifies various metabolites, produces hormones and digestive biochemicals, regulates glycogen storage, synthesizes proteins, and decomposes red blood cells. What organ is being studied by the student?

A. Heart
B. Kidneys
C. Liver
D. Lungs
E. Pancreas

48. What solution is used to determine the mass-volume fraction of ammonia in a solution?

A. Iodine solution
B. Hydrochloric acid solution
C. Potassium permanganate solution
D. Sulfuric acid solution
E. Sodium hydroxide solution

49. A benzimidazole derivative, omeprazole, has been prescribed to a patient with a duodenal ulcer accompanied by an increased secretion of gastric juice. What is the mechanism of action of this drug?

A. Stimulation of H^+, K^+-ATPase
B. Blockade of M1-cholinergic receptors
C. Stimulation of H2-histamine receptors
D. Blockade of H2-histamine receptors
E. Irreversible blockade of H^+, K^+-ATPase

50. X-ray of a 59-year-old patient shows a distinct shadow, differential for tumor, in the lower lobe of the right lung. Provisionally, the tumor has been identified as benign. What characteristic allows classifying the tumor as benign?

A. Invasion into the surrounding tissues
B. Infiltrating growth
C. Cancer cachexia
D. Metastasis
E. Expansive growth