

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

Coronaviruses, Including SARS and MERS

Human coronaviruses (HCoV) are associated most frequently with the common cold, an upper respiratory tract infection characterized by rhinorrhea, nasal congestion, sore throat, sneezing, and cough that can be associated with fever. Human coronavirus infections can also be associated lower respiratory tract infections, including bronchiolitis, croup, and pneumonia, primarily in infants and immunocompromised children and adults.

SARS-CoV, the HCoV responsible for the 2002-2003 global outbreak of severe acute respiratory syndrome (SARS), was associated with more severe symptoms, although a spectrum of disease, including asymptomatic infections and mild disease, occurred. SARS-CoV disproportionately affected adults, who typically presented with fever, myalgia, headache, malaise, and chills followed by a nonproductive cough and dyspnea generally 5 to 7 days later. Approximately 25% of infected adults developed watery diarrhea. The overall associated mortality rate was approximately 10%. The case-fatality rate in people older than 60 years approached 50%. Typical laboratory abnormalities included lymphopenia and increased lactate dehydrogenase and creatine kinase concentrations.

Pneumothoraces and other signs of barotrauma were common in critically ill patients receiving mechanical ventilation.

SARS-CoV infections in children are less severe than in adults; notably, no infant or child deaths from SARS-CoV infection were documented in the 2002-2003 global outbreak.

MERS-CoV, the HCoV associated with Middle East respiratory syndrome (MERS), can also cause severe disease. MERS-CoV is associated with a severe respiratory illness similar to SARS-CoV, although a spectrum of disease, including asymptomatic infections and mild disease, can occur. Patients commonly present with fever, myalgia, chills, shortness of breath, and cough. Approximately 25% of patients also experience vomiting, diarrhea, or abdominal pain. Rapid deterioration of oxygenation with progressive unilateral or bilateral airspace infiltrates on chest imaging may follow, requiring mechanical ventilation. The case-fatality rate is high, estimated at nearly 50%. To date, most infections have been reported in male adults with comorbidities, such as diabetes, chronic renal disease, hypertension, and chronic cardiac disease.

1. Human coronaviruses are always associated with the symptoms of the common cold.

- A. False
- B. True
- C. Not given
- D. -
- E. -

2. In rare cases, coronaviruses can cause pneumonia.

- A.** True
- B.** False
- C.** Not given
- D.** -
- E.** -

3. During the SARS outbreak, the lethal cases happened only among adults.

- A.** True
- B.** False
- C.** Not given
- D.** -
- E.** -

4. Pneumothorax was a common complication of SARS.

- A.** False
- B.** True
- C.** Not given
- D.** -
- E.** -

5. Choose the correct statement.

- A.** Coronaviruses has existed for a long time and most commonly are associated with the common cold
- B.** Coronavirus infection first appeared in 2002, when the global outbreak of SARS has happened
- C.** MERS is the biggest outbreak of coronavirus infection
- D.** Coronavirus infection has never been widespread among humans
- E.** -

6. For which category of people was the SARS infection the most dangerous?

- A.** For elderly patients
- B.** For children
- C.** For newborns
- D.** For adults
- E.** -

7. Choose the correct statement.

- A.** Gastrointestinal symptoms are quite common for SARS and MERS
- B.** Gastrointestinal symptoms are quite common for SARS only
- C.** Gastrointestinal symptoms are quite common for MERS only
- D.** Gastrointestinal symptoms are common for neither SARS nor MERS
- E.** -

8. Choose the correct statement.

- A.** The highest fatality rate for coronavirus infection was during the MERS outbreak
- B.** The highest fatality rate for coronavirus infection was during the SARS outbreak
- C.** There have never been any cases of death related to coronavirus infection
- D.** The highest fatality rate for coronavirus infection was for neonatal patients
- E.** -

9. For which category of people was the MERS infection the most dangerous?

- A.** For people who had any comorbidities
- B.** For males
- C.** For intubated patients
- D.** For asymptomatic patients
- E.** -

10. What are the laboratory findings in patients with SARS?

- A.** The decreased level of lymphocytes
- B.** The elevation of the level of lymphocytes
- C.** The reduced amount of lactate dehydrogenase
- D.** There are no laboratory changes
- E.** -

11. What value determines the degree to which foreign ions can influence the potential of an ion-selective electrode?

- A.** Selectivity coefficient
- B.** Diffusion coefficient
- C.** Activity coefficient
- D.** Electrical conductivity coefficient
- E.** Osmotic coefficient

12. During bacteriology of the feces of a patient with diarrhea, a pure culture of rod-shaped, slightly bent microorganisms was isolated. In the microslide, these microorganisms resemble schools of fish. Their inoculation on alkaline media (alkaline peptone water) results in formation of a blue-tinted film after 6 hours. What pathogen has such properties?

- A.** *Vibrio cholerae*
- B.** *Escherichia coli*
- C.** Salmonellae
- D.** Spirochetes
- E.** Mycobacteria

13. To determine the qualitative content of a drug, a sample of the analyte solution was processed with 2M solution of *HCl*. A white precipitate, soluble in aqueous ammonia solution, was formed. This analytical effect indicates the presence of the following cations:

- A.** Silver(I) cations
- B.** Lead(II) cations
- C.** Mercury(I) cations
- D.** Mercury(II) cations
- E.** Tin(II) cations

14. What has an effect on the coagulating action of the coagulant ion, according to the Schulze-Hardy rule?

- A.** Ionic charge
- B.** Ionic size
- C.** Adsorbability
- D.** Hydration ability
- E.** Polarization

15. Having examined the patient, the doctor made a diagnosis of tick-borne encephalitis. What is the route of transmission of this disease?

- A.** Vector-borne
- B.** Vertical
- C.** Airborne-droplet
- D.** Fecal-oral
- E.** Parenteral

16. What reaction can be classified as a pseudo-first-order reaction?

- A.** Hydrolysis of sucrose
- B.** Etherification
- C.** Saponification
- D.** Neutralization
- E.** Combustion

17. What parameter takes into account the deviation of the properties of a real solution from an ideal one?

- A.** Activity
- B.** Fugacity
- C.** Isotonic coefficient
- D.** Degree of dissociation
- E.** Concentration

18. Elevated levels of ketone

bodies were detected in the blood of a patient with diabetes mellitus. Ketone bodies are synthesized from the following compound:

- A. Acetyl-CoA
- B. Succinate
- C. Lactate
- D. Glucose
- E. Malate

19. What is used as an indicator in the back titration of an aqueous solution of acetic acid?

- A. Phenolphthalein
- B. Diphenylamine
- C. Diphenylcarbazone
- D. Eriochrome black T
- E. Murexide

20. Sulfanilamides contain a primary aromatic amino group in their structure. What method is used for quantitative determination of these compounds?

- A. Nitritometry
- B. Iodometry
- C. Dichromatometry
- D. Permanganatometry
- E. Cerimetry

21. To assess the bacterial contamination of the soil, where humans or animals are the source of contamination, the presence of sanitary indicator microorganisms must be determined. What microorganism indicates old fecal contamination of the soil?

- A. *Clostridium perfringens*
- B. *Escherichia coli*
- C. *Streptococcus faecalis*
- D. *Salmonella enteritidis*
- E. *Pseudomonas aeruginosa*

22. Patients with gout have in their blood an increased concentration of a certain acid, the chemical formula of which is given below. Increased levels of this acid promote the formation of stones in the kidneys and lead to a number of pathological medical conditions. What substance is the precursor to the described acid?

- A. Purine
- B. Indole
- C. Pyrazine
- D. Pyrazole
- E. Pyridine

23. Total protein in blood serum is one of metabolic indicators. What test is usually used in clinical laboratories to determine this value?

- A. Biuret test
- B. Ninhydrin test
- C. Xanthoproteic test
- D. Lead acetate test
- E. Sodium nitroprusside test

24. A patient has been diagnosed with acute pancreatitis. For diagnostic purposes, it is necessary to measure the activity of a certain enzyme in the patient's blood. What enzyme is it?

- A. Amylase
- B. Aldolase
- C. Lactate dehydrogenase
- D. Creatine kinase
- E. Pepsin

25. What tissue can be characterized by permeable cells

located within the root of the primary structure?

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

26. Gastric herbal tea contains oval brown lignified "cones" up to 1.5 cm long, which are:

- A. *Alnus* infructescences
- B. *Larix* cones
- C. *Cupressus* cones
- D. *Juniperus* galbuli
- E. *Platyclusus orientalis* cones

27. A patient with Cushing syndrome has persistent hyperglycemia and glucosuria. In this case, increased synthesis and secretion of a certain hormone can be observed. What hormone is it?

- A. Cortisol
- B. Adrenaline
- C. Glucagon
- D. Thyroxine
- E. Insulin

28. During the analysis of the cations that belong to the fourth analytical group (acid-base classification), their processing with a group reagent makes it possible not only to separate, but also to identify the following ions:

- A. Cr(III) ions
- B. As(III) ions
- C. Zn(II) ions
- D. Sn(IV) ions
- E. Al(III) ions

29. A 53-year-old person has been admitted into the gastroenterology department

with complaints of dyspeptic disorders and melena. Objectively, the patient has splenomegaly, ascites, and dilated superficial veins of the anterior abdominal wall. What syndrome can be characterized by these signs?

- A. Portal hypertension
- B. Cholemia
- C. Acholia
- D. Suprahepatic jaundice
- E. Arterial hypotension

30. What type of fruit is characteristic of *Atropa belladonna*?

- A. Berry
- B. Capsule
- C. Legume
- D. Silique
- E. Hesperidium

31. A person came to a doctor with complaints of loss of sensitivity and pain along the peripheral nerves. Blood testing revealed elevated levels of pyruvic acid. What vitamin can cause such changes, if it is deficient in the body?

- A. Vitamin B1
- B. Vitamin PP
- C. Biotin
- D. Vitamin B2
- E. Pantothenic acid

32. A patient has been warned that his prescribed drug can cause a cough. What drug is it?

- A. Lisinopril
- B. Clophelin (Clonidine)
- C. Phenihydine (Nifedipine)
- D. Dichlothiazide (Hydrochlorothiazide)
- E. Metoprolol

33. A patient with rheumatoid arthritis and concomitant

duodenal ulcer needs to be prescribed a nonsteroidal anti-inflammatory drug. What drug would be the best choice in this case?

- A. Celecoxib
- B. Acetylsalicylic acid
- C. Paracetamol
- D. Metamizole
- E. Diclofenac sodium

34. What pharmacological effect of diazepam allows using it in the treatment of neuroses?

- A. Anxiolytic
- B. Analgesic
- C. Diuretic
- D. Antipyretic
- E. Antidepressant

35. What family of viruses has a unique reverse transcriptase enzyme?

- A. Retroviruses
- B. Picornaviruses
- C. Reoviruses
- D. Togaviruses
- E. Flaviviruses

36. What ability of high-molecular compounds prevents precipitation of lyophobic sols and deposition of cholesterol plaques on the vessel walls?

- A. Colloidal protection
- B. Coacervation
- C. Sedimentation
- D. Coagulation
- E. Thixotropy

37. What is the mechanism of action of beta-lactam antibiotics?

- A. Inhibition of cell wall synthesis
- B. Inhibition of cytoplasmic membrane synthesis
- C. Inhibition of protein synthesis in ribosomes
- D. Disruption of DNA synthesis
- E. Inhibition of DNA gyrase

38. What is the most common side effect of inhaled corticosteroids?

- A. Oropharyngeal candidiasis
- B. Increased body mass
- C. Osteoporosis
- D. Subcapsular cataract
- E. Arterial hypertension

39. What drug should not be prescribed for the treatment of arterial hypertension in a patient with gout?

- A. Hydrochlorothiazide
- B. Atenolol
- C. Amlodipine
- D. Enalapril
- E. Cozaar (Losartan)

40. What stage of chronic renal failure can be characterized by metabolic acidosis, azotemia, itching, ammonia breath, and impaired functioning of vital organs?

- A. Uremia
- B. Tubulopathy
- C. Renal colic
- D. Acute renal failure
- E. Nephrotic syndrome

41. Various types of immunobiological agents are used for immunoprophylaxis of infectious diseases. What type of prophylaxis involves the use of immune sera and gamma globulins?

- A. Specific passive
- B. Specific active
- C. Non-specific
- D. General
- E. Immunotropic

42. A man came to a doctor complaining of a headache, pain in the throat during swallowing, and an increase in the body temperature. He was diagnosed with tonsillitis. What changes in the patient's blood can be expected in this case?

- A. Neutrophilic leukocytosis
- B. Eosinophilic leukocytosis
- C. Basophilic leukocytosis
- D. Lymphocytosis
- E. Monocytosis

43. An analytical chemist performs a qualitative analysis of cations that belong to the sixth analytical group. If nickel ions are processed with Chugaiev's reagent (dimethylglyoxime), a colored compound is produced. What is the color of the resulting compound?

- A. Red
- B. Violet
- C. Yellow
- D. Blue
- E. Green

44. Microscopy shows that basidia with basidiospores are formed on the hymenium. What division do these fungi belong to?

- A. *Basidiomycota*
- B. *Ascomycota*
- C. *Zygomycota*
- D. *Chytridiomycota*
- E. *Lychenophyta*

45. A woman in the state of ketoacidotic coma has loud rapid respiration: a labored expiration

with active participation of expiratory muscles occurs after a deep inspiration. What type of pathological respiration is it?

- A. Kussmaul
- B. Cheyne-Stokes
- C. Gasping
- D. Stenotic
- E. Biot

46. Salts and esters of oxalic acid are called:

- A. Oxalates
- B. Adipinates
- C. Succinates
- D. Malonates
- E. Urates

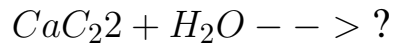
47. A 55-year-old man came to a doctor with complaints of acute pain in his big toes. Meat and wine are a permanent part of his diet. The doctor suspects gout. What substance must be measured in the patient's blood to confirm this diagnosis?

- A. Uric acid
- B. Urea
- C. Lactate
- D. Bilirubin
- E. Ketone bodies

48. Pyrazole and imidazole exhibit amphoteric properties due to:

- A. Presence of pyrrolic and pyridine nitrogen atoms
- B. Prototropic (azole) tautomerism
- C. Electron-acceptor properties of two nitrogen atoms
- D. Formation of intermolecular hydrogen bonds
- E. P-pi conjugation

49. What is the product of calcium carbide reaction with water?



- A.** $\text{CH} \equiv \text{CH}$
- B.** $\text{CH}_3 - \text{CH}_3$
- C.** $\text{CH}_2 = \text{CH}_2$
- D.** CH_4
- E.** $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$

50. What can be used to

distinguish formic acid from acetic acid?

- A.** $[\text{Ag}(\text{NH}_3)_2]\text{OH}$
- B.** NaOH
- C.** $\text{Br}_2(\text{H}_2\text{O})$
- D.** H_2SO_4
- E.** NaHCO_3