

LITHUANIAN UNIVERSITY OF HEALTH SCIENCES



ENTRANCE EXAMINATION TEST

SET No. 1

Name.....

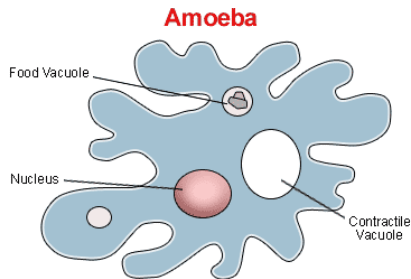
Applying to the Faculty.....

Place of Examination (City).....

Date.....

BIOLOGY

1. An amoeba moves by:



- a) Pseudopodia
- b) Parapodia
- c) Uropodia
- d) Flagella

2. If one strand of a DNA molecule has the base sequence A-T-G-C-A-G, the complementary strand has the sequence:

- a) G-C-A-T-G-A
- b) G-A-C-G-T-A
- c) A-U-G-C-A-G
- d) A-T-G-C-A-G
- e) T-A-C-G-T-C

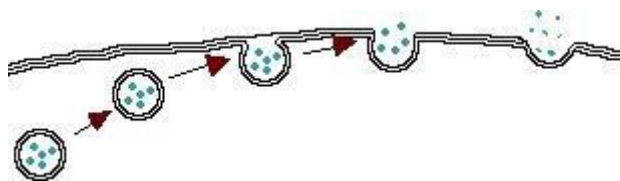
3. Which of the following is a part of RNA but not DNA?

- a) Adenine
- b) Guanine
- c) Thymine
- d) Uracil
- e) Cytosine

4. Cellular components found in both eukaryotic and prokaryotic cells include:

- a) A nuclear region, but not a plasma membrane
- b) Cytoplasm, but not nucleoli
- c) A cell wall, but not flagella
- d) Organelles, but not a nucleus
- e) A plasma membrane, but not cytoplasm

5. Energy-producing organelles are:
- a) Lysosomes
 - b) Ribosomes
 - c) Nucleus
 - d) Mitochondria
6. Which of the following is an organelle involved in gene expression?
- a) Peroxisome
 - b) Ribosome
 - c) Glyoxysome
 - d) Vacuole
7. Which organelle is responsible for destroying worn-out (old) cell parts?
- a) Peroxisome
 - b) Ribosome
 - c) Lysosome
 - d) Golgi apparatus
8. Which process is best represented by the diagram below:

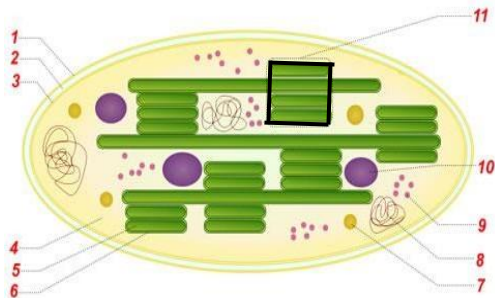


- a) Endocytosis
- b) Active transport
- c) Exocytosis
- d) Osmosis

9. Organisms that do not have the ability to produce or synthesize their own food are called:

- a) Anaerobic
- b) Autotrophs
- c) Exergonic
- d) Catabolic
- e) Heterotrophs

10. A granum is indicated by number:

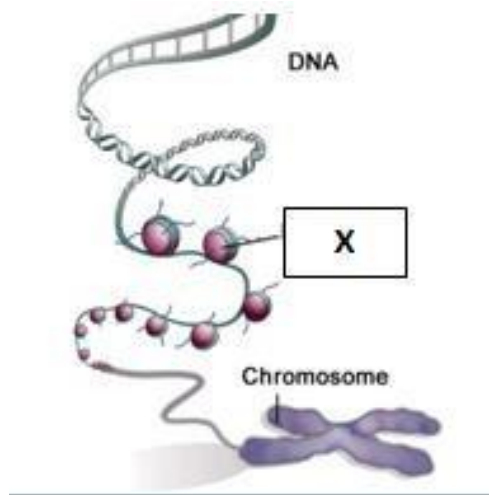


- a) 11
- b) 10
- c) 4
- d) 9

11. Gametes of a person whose general body cells contain 46 chromosomes have only 23 chromosomes. This set of chromosomes is called:

- a) Septaploid
- b) Diploid
- c) Monoploid
- d) Haploid

12. In the eukaryote chromosome, DNA is coiled around a complex of:



- a) Histamines
- b) Nucleotides
- c) Heterochromatin
- d) Histones

13. During which stage of meiosis does crossing over occur?

- a) Prophase I
- b) Prophase II
- c) Anaphase I
- d) Anaphase II

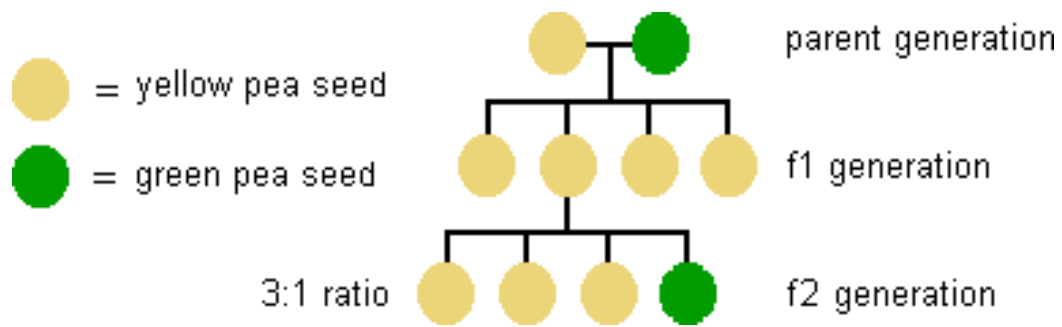
14. The cell has 12 chromosomes. How many chromosomes it will contain after meiosis?

- a) 12
- b) 6
- c) 24
- d) 48

15. The function of a glomerulus is:

- a) Neutralizing gastric juice
- b) Neutralizing Mg^{2+}
- c) Filtering the blood
- d) Glomerization of the liver

16. In the diagram below, what accounts for the green pea seed in the f2 generation?



- a) On average, 1 out of 4 offspring of heterozygous parents will be homozygous recessive
 - b) The yellow allele is dominant over the green one
 - c) The f1 generation parents are homozygous yellow
17. Which of the following types of molecules are the major structural components of the cell membrane?
- a) Phospholipids and cellulose
 - b) Nucleic acids and proteins
 - c) Phospholipids and proteins
 - d) Proteins and cellulose
18. Viruses that attack bacteria are called:
- a) Bacteriophages
 - b) Bacteriostats
 - c) Bacterioblasts
 - d) Bacteriocides
19. Microtubules and microfilaments are structures that make up which of the following?
- a) Cytoskeleton
 - b) Cytoplasm
 - c) Cell wall
 - d) Vacuole

20. What are the membrane structures that function in active transport?
- a) Peripheral proteins
 - b) Carbohydrates
 - c) Cholesterol
 - d) Integral proteins
21. Phagocytic cells of the immune system are called:
- a) Macrophages
 - b) Erythrocytes
 - c) Thrombocytes
 - d) Melanocytes
22. Cells associated with respiratory function are:
- a) Supporting cells
 - b) Mast cells
 - c) Exocrine glands
 - d) Erythrocytes
23. The point at which an impulse is transmitted from one neuron to another neuron is called:
- a) Dendrite
 - b) Glial cell
 - c) Nerve centre
 - d) Synapse
24. The process whereby the stomach muscles contract to propel food through the digestive tract is called:
- a) Absorption
 - b) Emulsion
 - c) Peristalsis
 - d) Secretion

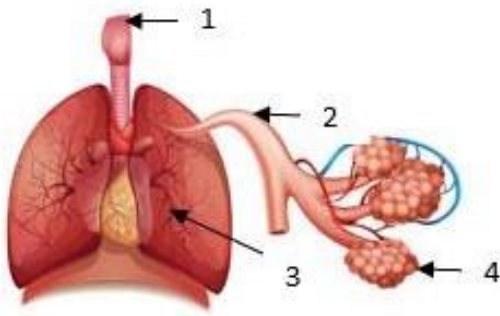
25. Enzymes that break up starches and other carbohydrates are called:

- a) Proteases
- b) Lipases
- c) Amylases
- d) Triglycerides

26. The pancreas releases digestive enzymes into:

- a) Colon
- b) Oesophagus
- c) Stomach
- d) Duodenum

27. What is the part of the respiratory system indicated by number 4?

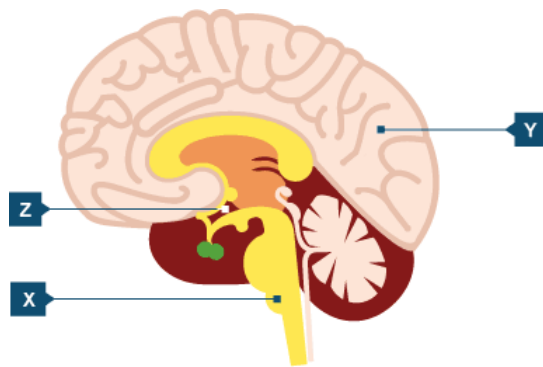


- a) Alveoli
- b) Bronchus
- c) Trachea
- d) Bronchioles

28. Which of the following statements about the circulatory systems is true?

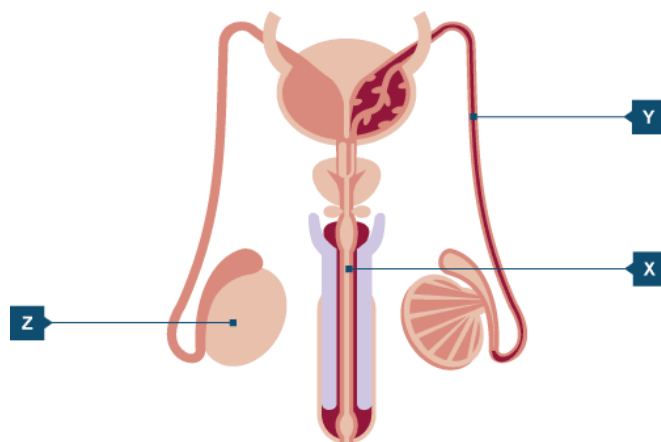
- a) Hormones are transported in the blood
- b) All invertebrates have an open circulatory system
- c) Capillaries have thicker walls than veins do
- d) An amoeba has an open circulatory system

29. Which letter on the diagram (picture) is pointing at the medulla oblongata:



- a) Y
- b) Z
- c) X

30. Which letter labels the site of sperm production in humans?



- a) Y
- b) Z
- c) X

CHEMISTRY

1. Which of the compounds listed below is not correctly paired with its name?

- a) KOH is potassium hydroxide
- b) H_2SO_3 is sulphurous acid
- c) HI is hydroiodic acid
- d) HClO_2 is chloric acid

2. When oxygen combines with an element to form a compound, the resulting compound is called:

- a) A salt
- b) An oxide
- c) Oxidation
- d) An oxalate

3. Which of the following statements is true?

- a) NaCl is a neutral salt
- b) KOH is an acid
- c) HCl and KOH react to form hydrogen gas and water.
- d) NaBr is a basic salt

4. A substance that can be further simplified by ordinary chemical means may be which of the following?

- a) An element or a compound
- b) A mixture or a compound
- c) An element of a mixture
- d) None of the above

5. When an electrolyte forms into a solution, it dissolves or dissociates into ions, a process called ionization. If a substance does not ionize, it will not conduct an electric current. Which of the following compounds is a nonelectrolyte?

- a) HCl
- b) H_2SO_4
- c) C_3H_8 (propane gas)
- d) NaCl

6. Table salt – sodium chloride NaCl, one the most common substances occurring in nature – is best classified as which of the following?
- A compound
 - A mixture
 - An alloy
 - An amalgam
7. In which of the following molecules does hydrogen have an oxidation number of -1 ?
- H₂O
 - H₂
 - NaH
 - NaOH
8. The total number of electrons in a neutral atom of every element is always equal to the atom's:
- Number of neutrons
 - Number of nucleons
 - Number of protons
 - Mass number
9. Within a specified period, an increase in atomic number is usually accompanied by:
- An increase in atomic radius and an increase in electronegativity
 - A decrease in atomic radius and an increase in electronegativity
 - An increase in atomic radius and a decrease in electronegativity
 - A decrease in atomic radius and a decrease in electronegativity
10. An atom of carbon-14 contains:
- 8 protons, 6 neutrons, 6 electrons
 - 6 protons, 6 neutrons, 8 electrons
 - 6 protons, 8 neutrons, 8 electrons
 - 6 protons, 8 neutrons, 6 electrons
11. When NaOH (aq) reacts with HCl (aq) and the resulting solution is evaporated to dryness, the solid remaining is:
- An ester
 - An alcohol
 - A salt
 - A metal

12. What is the total mass in grams of 0.75 mole of SO_2 ? (atomic weights: S=32.0, O=16.0)

- a) 16 g
- b) 24 g
- c) 32 g
- d) 48 g

13. Adding a catalyst to a chemical reaction will:

- a) Lower the activation energy needed
- b) Lower the potential energy of the reactants
- c) Increase the activation energy needed
- d) Increase the potential energy of the reactants

14. What is the oxidation number of oxygen in HSO_4^- ?

- a) +1
- b) -2
- c) +6
- d) -4

15. Which equation represents the phase change called sublimation?

- a) $\text{CO}_2(\text{s}) \rightarrow \text{CO}_2(\text{g})$
- b) $\text{H}_2\text{O}(\text{s}) \rightarrow \text{H}_2\text{O}(\text{l})$
- c) $\text{H}_2\text{O}(\text{l}) \rightarrow \text{H}_2\text{O}(\text{g})$
- d) $\text{NaCl}(\text{l}) \rightarrow \text{NaCl}(\text{s})$

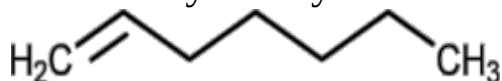
16. A chemist combines 300 mL of a 0.3 M Na_2SO_4 solution with 200 mL of 0.4 M BaCl_2 . How many grams of precipitate form?

- a) No precipitate is formed
- b) 21.0 g
- c) 233.4 g
- d) 18.7 g

17. Which of the following is a physical property of sugar?

- a) It is composed of carbon, hydrogen and oxygen
- b) It turns black with concentrated H_2SO_4
- c) It can be decomposed with heat
- d) It is a white crystalline solid

18. Identify this hydrocarbon:



- a) 1-hexene
- b) 1-heptene
- c) 2-septene
- d) 1-seventene

19. What is the IUPAC name for $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$?

- a) Propane
- b) Ethanol
- c) Propanol
- d) Propenol

20. Which of the following reactions will be favoured when the pressure in a system is increased?

- I. $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
 - II. $\text{Mg}(\text{s}) + 2\text{H}_2\text{O}(\text{g}) \rightarrow \text{Mg}(\text{OH})_2(\text{g}) + \text{H}_2(\text{g})$
 - III. $2\text{N}_2\text{O}_5(\text{g}) \rightarrow \text{O}_2(\text{g}) + 4\text{NO}_2(\text{g})$
- a) II and III only
 - b) I, II, and III
 - c) I only
 - d) II only

21. $\text{NaOH} + \text{FeCl}_3 \rightarrow \text{NaCl} + \text{Fe}(\text{OH})_3$

The balancing numbers (coefficients) of the reaction are respectively:

- a) 3, 1, 3, and 1
- b) 1, 1, 3, and 1
- c) 3, 2, 2, and 2
- d) 3, 1, 1, and 1

22. As temperature rises, solids generally become more soluble in water, but gases become less soluble. If a soft drink contains high concentrations of sugar and carbon dioxide, which of the following may be expected to happen if it is cooled down?

- I. Sugar may precipitate out
 - II. Gas bubbles may form and produce foam
 - III. Water may evaporate rapidly
- a) I only
 - b) II only
 - c) I and II only
 - d) I and III only

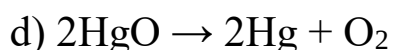
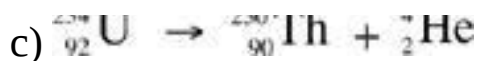
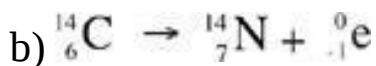
23. A phase change is a process whereby matter changes a form (solid, liquid, gas). Which one of the following constitutes a phase change?

- a) Burning of wood
- b) Digestion of food
- c) Melting of candle wax
- d) Photosynthesis

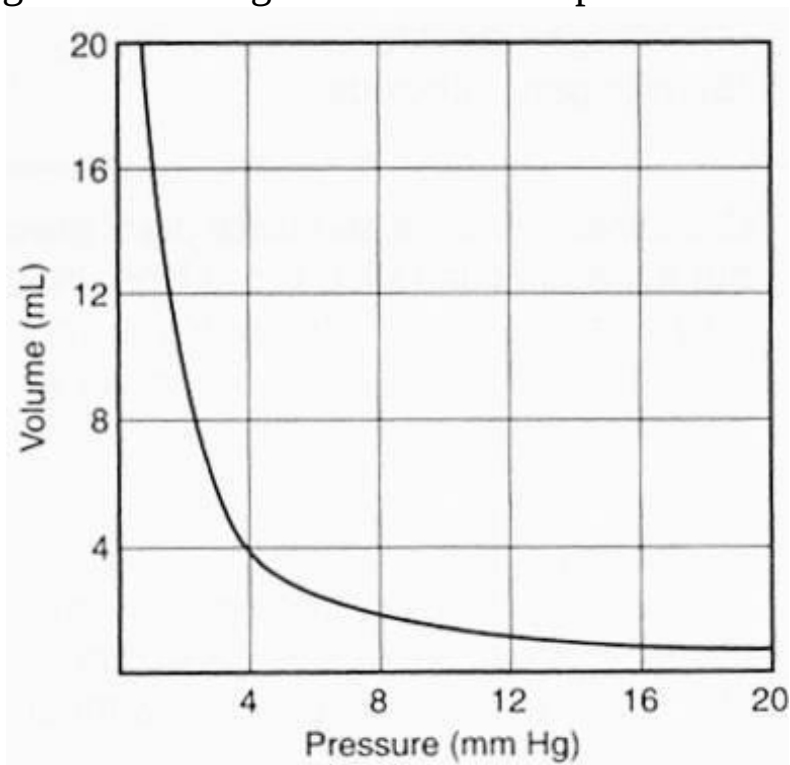
24. Two positively charged ions:

- a) attract each other
- b) neither attract nor repel each other
- c) attract each other when the distance between them is small
- d) repel each other

25. Which of the following reactions represents an oxidation-reduction reaction?



26. This graph represents the relationship of the pressure and volume of a given mass of gas at constant temperature.



When the pressure equals 8 millimetres of mercury (mm Hg), what is the volume in millilitres (mL)?

- a) 2
- b) 4
- c) 8
- d) 16

27. A 10% solution of NaCl means that in 100 g of solution there is:

- a) 5.85 g NaCl
- b) 58.5 g NaCl
- c) 10 g NaCl
- d) 94 g of H₂O

28. The characteristic group of an organic ester is:

- a) -CO-
- b) -COOH
- c) -O-
- d) -COO-

29. Always amphoteric in nature are:

- a) Nucleic acids
- b) Carbohydrates
- c) Lipids
- d) Amino acids

30. If the ΔH of a reaction is a negative quantity, the reaction is definitely:

- a) Endothermic
- b) Unstable
- c) Exothermic
- d) Reversible



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