

المستوي الأول / برنامج البيولوجيا الجزيئية
علم الحيوان العام (1) (102 ح)

Date: 04-01-2025

Time: 3 hours

Marks: 120

الإمتحان في 5 صفحات

Answer ALL the following questions:

Question (1):

(40 Marks)

(A) Write on:

(15 marks)

a- Fats.

b-Functions of proteins.

c- Feedback regulation

(B) Complete the following with suitable word(s):

(10 marks)

DO NOT copy the sentences to your answer sheet

- _____ (1) _____ are organisms, such as animals, that feed on other organisms or their remains.
- _____ (2) _____ is phenomenon that is recognized by what living things do.
- The entire "library" of genetic instructions that an organism inherits is called _____ (3) _____.
- A _____ (4) _____ cell lacks a nucleus or other membrane-enclosed organelles.
- A _____ (5) _____ is a chemical structure consisting of two or more units called atoms.
- A disaccharide consists of two monosaccharides joined by a _____ (6) _____ linkage.
- An amino acid is an organic molecule with both an _____ (7) _____ group and a -COOH group.
- Darwin suggested that contemporary species arose from a succession of ancestors that differed from them. He called this concept _____ (8) _____.
- Each DNA strand is made up of chemical building blocks called _____ (9) _____.
- The array of organisms inhabiting a particular ecosystem is called a biological _____ (10) _____.

(c) Which of the following statements are probably true (√) and which are probably false (×)? (15 marks)

DO NOT copy the sentences to your answer sheet

1. In humans, glycogen stores are depleted in about 3 days unless they are replenished by eating.
2. Differences between organisms reflect differences between their genetic codes rather than between their nucleotide sequences.
3. A saturated fatty acid has one or more double bonds.
4. Energy flows through an ecosystem in one direction.
5. A butterfly uses chemical energy stored in its food to power flight and other work.
6. Glucose and galactose, differ only in the placement of parts around one asymmetric carbon.
7. In sickle-cell disease, the angular macrophages clog tiny blood vessels, impeding blood flow.
8. Lipids are generally big enough to be considered macromolecules.
9. Ferritin is the major source of amino acids for baby mammals.
10. Misfolded transthyretin was implicated in senile dementia.
11. The functional shape of tRNA results from base pairing between nucleotides.
12. The structure of glycogen fits its function; more free ends are available for hydrolysis.

13. Scientists calculate that CO₂ produced by human activities has increased the average temperature of the planet by about 10°C since 1900.
14. The regulation of blood flow through the blood vessels of the jackrabbit's ears prevents heat exchange with the surrounding air.
15. The chemical nature of the protein is determined by the kind and sequence of the side chains.

Question (2):

(40 Marks)

(A) Answer the following:

(15 marks)

- 1- Briefly describe how urine is formed?
- 2- Summarize the functions of kidney.
- 3- Explain the mechanics of respiration.

(B) Complete the following with suitable word(s):

(10 marks)

DO NOT copy the sentences to your answer sheet

- _____(1)_____ (hormone) regulates the quantities and concentrations of both sodium and potassium ions in the extracellular fluid.
- _____(2)_____ is a group of small fibres located in the superior wall of the right atrium.
- _____(3)_____ is a hormone secreted by the anterior pituitary gland and it stimulates both breast growth and secretory functions.
- _____(4)_____ is the organ of sound-production and speech. Speech is produced by the vibration of the vocal cords.
- _____(5)_____ is the process of contraction of about 2 cm of the intestinal wall to move the chyme back and forth.
- _____(6)_____ is the process of synthesizing glucose from noncarbohydrate sources.
- Coagulation factors like fibrinogen are produced by _____(7)_____.
- G-cells of the pyloric glands secrete the hormone _____(8)_____.
- Heart and most of the great blood vessels have _____(9)_____ which prevent regurgitation of the pumped blood.
- In the first trimester fetus, the _____(10)_____ is the main site of red blood cell production.

(C) Which of the following statements are probably true (✓) and which are probably false

(×)?

DO NOT copy the sentences to your answer sheet

(15 marks)

- 1- Because the afferent arteriole is larger than the efferent arteriole, a pressure of about 20 mm Hg is generated in glomerulus.
- 2- Bile contains no pigments.
- 3- Chymotrypsinogens are converted into chymotrypsins by Trypsin.
- 4- Ductal cells of the pancreas secrete about 1200 - 1500 ml of juice daily.
- 5- Degradation of protein and amino acid hormones occurs after binding of the hormone-receptor complex to the chromatin.
- 6- In human, the blood does leave the vessels to bath the cells.
- 7- It takes 2-4 hours to propel the chyme from the duodenum to the colon.
- 8- Liver stores iron and copper.
- 9- The adult human liver normally weighs between 0.5 kg.
- 10- Proteins are partially digested in mouth.
- 11- Respiration plays a role in regulating blood pH.
- 12- Sympathetic and parasympathetic activities do not generate the electrical activity.

- 13- Each human kidney is composed of about 1000,000 nephrons.
14- Circulatory system plays a role in regulating the heat of the body.
15- There are 3 major secretions in the human digestive system.

Question (3):

(23Marks)
(18 marks)

(I) Chose the correct answer

- 1- What is the fluid mosaic model of the membrane structure?
 - a) rigid arrangement of proteins and lipids
 - b) A fluid structure with moving proteins and lipids
 - c) A non-fluid model with no protein movement
- 2- The technique of cell fractionation based on
 - a) Size and shape
 - b) Size and density
 - c) Size, density, and shape
- 3- Which of the following best describes the structure of bone tissue?
 - a) A network of collagen fibers embedded in a gel-like matrix
 - b) A hard matrix organized into lamellae around central canals
 - c) A loose network of fibers and ground substance
- 4- Which type of molecule can move directly through the lipid bilayer?
 - a) Polar molecules.
 - b) Nonpolar, hydrophobic molecules.
 - c) Large charged molecules.
- 5- What is exocytosis?
 - a) Vesicles release their contents outside the cell
 - b) The cell engulfs large particles
 - c) Solutes move via passive diffusion
- 6- What is the purpose of goblet cells in simple columnar epithelium?
 - a) Absorption.
 - b) Secretion of mucus.
 - c) Movement of material.
- 7- Which of the following is a function of the Smooth Endoplasmic Reticulum?
 - a) Synthesizes lipids
 - b) Synthesizes proteins
 - c) Modifies proteins
- 8- What is the primary function of the Golgi Apparatus?
 - a) Breakdown of lipids
 - b) Storage and modification of proteins
 - c) Synthesis of ribosomes
- 9- Which of the following correctly matches a nuclear structure with its function?
 - a) Chromosomes - contains RNA and histones
 - b) Nuclear envelope - contains the nuclear ribosomes
 - c) Nuclear pores - allow molecules to move between the nucleus and cytoplasm
- 10- Where are lysosomal enzymes produced?
 - a) Mitochondria
 - b) Endoplasmic Reticulum
 - c) Golgi apparatus
- 11- Tendons and ligaments are made of tissue that has high tensile strength. What type of tissue makes up tendons and ligaments? ,

- a) Cartilage
 - b) Dense
 - c) Epithelial
- 12- What type of epithelium lines the urinary bladder and is capable of distention?
- a) Stratified cuboidal epithelium
 - b) Stratified squamous epithelium
 - c) Transitional epithelium
- 13- An epithelial membrane consists of _____ tissue.
- a) Epithelial and connective
 - b) Muscular and neural
 - c) Connective and muscular
- 14- Where are ribosomes synthesized in eukaryotic cells?
- a) Cytoplasm
 - b) Mitochondria
 - c) Nucleolus
- 15- Which of the following is a characteristic of dense regular connective tissue?
- a) Loosely packed fibers
 - b) Contains large amounts of ground substance
 - c) Fibers arranged in parallel bundles
- 16- Which organelles are involved in intracellular digestion?
- a) Golgi apparatus
 - b) Lysosomes
 - c) Ribosomes
- 17- What is the function of the cytoskeleton?
- a) Protein synthesis
 - b) Maintaining cell shape and integrity
 - c) Storing genetic material
- 18- Which of these is a characteristic of mitochondria?
- a) They have a single membrane
 - b) They contain their own DNA
 - c) They only produce ATP in the absence of oxygen

(II) Describe the major functions of the plasma membrane proteins. (5 marks)

Question (4): (17Marks)

I- Complete the missing parts: (5 marks)

- Proteins that penetrate the membrane lipid bilayer are frequently known as ___(1)___.
- The movement of solutes across the cell membrane against the concentration gradient; requires energy and a carrier protein called ___(2)___.
- To fuel daily life & growth, the cell must take in food & digest it, take in oxygen (O₂), make ATP, and remove wastes; the organelles that do this work are cell membrane, ___(3)___ lysosomes and ___(4)___.
- A type of tissue consists of cells that are arranged so closely together that there is very little intercellular material ___(5)___.

II- Put True or false and correct the false: (12 marks)

- 1- Lysosomes are responsible for intracellular digestion, known as phagocytosis.
- 2- The nuclear envelope has two unit membranes.
- 3- The main function of the Endoplasmic Reticulum is to produce ATP for the cell.
- 4- The basal surface of epithelial cells is attached to the underlying tissue by a basement membrane.
- 5- The Golgi apparatus modifies lipids and proteins that come from the Rough Endoplasmic Reticulum.
- 6- Erythrocytes are primarily responsible for immune defense
- 7- Lysosomes are primarily involved in protein synthesis
- 8- Mitochondria, ribosomes, and lysosomes are the primary organelles involved in energy production.
- 9- Cilia are used for absorption in epithelial tissue.
- 10- Blood is considered a type of connective tissue
- 11- Endocrine glands release their secretions into ducts
- 12- Fibroblasts produce collagen fibers and ground substances in connective tissue.

Best wishes,

Examiners:

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