MISSION M.B.BS

Date: 20/06/2022

Subject: ZOOLOGY

Topic : BIOMOLECULES - L1 Class: Standard XI

Instructions:

A

1. Carbohydrates, the most abundant biomolecules on Earth, are produced by:

   ✔ **A.** Some bacteria, algae and green plants

   ✘ **B.** Fungi, algae and green plant cells

   ✘ **C.** All bacteria, fungi and algae

   ✘ **D.** Viruses, fungi and bacteria

   Carbohydrates are produced by the process of photosynthesis. Photosynthesis is the process of transforming light energy into carbohydrates. Bacteria such as the cyanobacteria, algae and green plants are the major producers of carbohydrates on the Earth since they all possess the green pigment chlorophyll and perform photosynthesis.

2. Which of the following is not a secondary metabolite?

A. Rubber

B. Ricin

C. Morphine

D. Aspartic acid

The sum total of all the chemical reactions occurring in a body is called metabolic reactions. The chemicals that form the intermediates or products of a metabolic reaction are called metabolites.

Metabolites are of two types - primary and secondary metabolites.
The primary metabolites are substances which are directly involved in the growth and development of an organism. Proteins, carbohydrates, nucleic acids and lipids are primary metabolites.
Aspartic acid is an amino acid and hence is a primary metabolite.

Secondary metabolites are compounds produced by an organism but not directly involved in growth and development. These compounds have applications in human welfare. Rubber, ricin and morphine are examples of secondary metabolites.

3. Which of the following is true about compounds present in the acid-insoluble pool?

✗ **A.** They have a molecular weight more than 1000 daltons

✗ **B.** They are called macromolecules

✗ **C.** Lipid molecules weigh less than 1000 Daltons but still belong to the acid-insoluble pool

✓ **D.** All of the above

When living tissue is ground in trichloroacetic acid using a mortar and pestle and the slurry obtained is filtered using cheesecloth, two fractions are obtained after filtration. One of the fraction is soluble in acid whereas the other is insoluble in acid and is found on the cheesecloth.

The molecules in the acid-soluble pool have a molecular weight ranging from 18 to 800 daltons. Whereas the molecules in the acid-insoluble pool weigh above 1000 daltons. The molecules in the acid-soluble fraction are called as micromolecules or biomicromolecules. The molecules in the acid-insoluble pool are called macromolecules or biomacromolecules.

But lipids have a molecular weight less than 1000 daltons but still are found in the acid-insoluble pool. This is due to the cluster that lipids form, which becomes insoluble in acid.

4. Pentoses and hexoses are the most common:

A. Disaccharides

B. Monosaccharides

C. Oligosaccharides

D. Polysaccharides

A monosaccharide is the simplest form of sugar containing one carbohydrate residue. It cannot be hydrolysed further. Based on the number of carbon atoms, monosaccharides can be divided into trioses (having 3 carbon atoms), tetroses (having 4 carbon atoms), pentoses (having 5 carbon atoms) and hexoses (having 6 carbon atoms). For example - the ribose sugar present in the RNA and DNA is a pentose sugar with 5 carbon atoms and glucose is a hexose sugar with 6 carbon atoms.
Both pentoses and hexoses are monosaccharides.
Disaccharides are made up of 2 monosaccharide units joined together by a glycosidic bond.
Oligosaccharides are made up of more than 2 monosaccharides (3-10) joined by glycosidic bonds.
Polysaccharides are made up of more than 10 monosaccharide units joined by glycosidic bonds.

5. The general chemical formula of carbohydrate is:

A. $(CH_2O)_n$

B. $(CH_2O)_{2n}$

C. $(CHO)_n$

D. $C_nH_{2n}O$

The general chemical formula of carbohydrate is $(CH_2O)_n$. For example - in the case of glucose, substitute n=6, then the chemical formula of glucose is $C_6H_{12}O_6$.

6. Which of the following is not true about secondary metabolites?

- ✓ **A.** They have a direct role in photosynthesis, respiration and reproduction
- ✗ **B.** They include toxins, pigments, drugs and lectins
- ✗ **C.** Their distribution is limited and restricted to a special taxonomic group
- ✗ **D.** They are organic compounds of diverse nature

Metabolites are substances involved in metabolic pathways. Photosynthesis, respiration and reproduction are metabolic pathways and metabolites having a direct role in them are called primary metabolites.

Metabolites which do not have a direct role in the growth and development of an organism are called secondary metabolites. They include chemical compounds of diverse nature, such as pigments, toxins, drugs, lectins, gums and resins. They are not involved directly in the metabolic pathways such as photosynthesis, respiration and reproduction. Their distribution is restricted to a limited taxonomic group.

7. Which of the following is a ketose sugar?

- ✓ **A.** Fructose
- ✗ **B.** Glucose
- ✗ **C.** Galactose
- ✗ **D.** None of the above

Fructose is a ketose sugar because it has a ketone group (C=O) in its structure. It is also the sweetest sugar. Glucose and galactose are aldose sugars since they have an aldehyde group in their structures (-CHO).

8. The major set of elements present in living beings are

A. silicon, magnesium, calcium

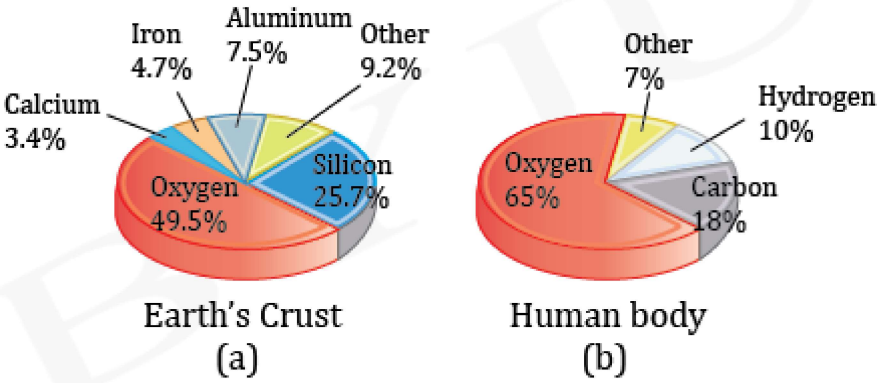
B. carbon, magnesium, silicon

C. hydrogen, iron, cobalt

D. carbon, hydrogen, oxygen

Carbon, hydrogen and oxygen are the elements that make up the majority of the living body. They constitute the macro and micro-biomolecules of the living body. The most abundant element in living tissue by mass is oxygen.

Silicon, magnesium, calcium, iron and cobalt are present in living tissue in trace amounts but are more abundant in earth's crust.



9. Which of the following is a primary metabolite?

A. Carbohydrates

B. Proteins

C. Lipids

D. All of these

The sum total of all the chemical reactions occurring in a body is called metabolic reactions. The chemicals that form the intermediates or products of a metabolic reaction are called metabolites. Metabolites are of two types - primary and secondary metabolites.

The primary metabolites are substances which are directly involved in the growth and development of an organism. Proteins, carbohydrates, nucleic acids and lipids are primary metabolites.

Secondary metabolites are compounds produced by an organism but not directly involved in growth and development. These compounds have applications in human welfare. Rubber, ricin and morphine are examples of secondary metabolites.

10. Most abundant organic compound on Earth:

A. Protein

B. Cellulose

C. Lipids

D. Steriods

Cellulose is a polysaccharide composed of glucose units linked together by beta 1,4 glycosidic linkage. It is a non-reducing sugar found in the cell wall of the plants. Cellulose is the most abundant organic compound on Earth. It is the main constituent of the plant cell wall. Its main function is to provide structural support to plants.
Proteins are made up of amino acids.
Lipids are made up of fatty acids.
Steroids are mostly lipids.