

Chp - 02

Biological Molecules

Short question and Answers :

Answer # 1

Bio-chemistry is the study of structure and composition of chemical compounds found in living organisms and the chemical process taking place within or related to living organisms -

Answer # 2

Out of 92 naturally occurring elements on earth approximately 25 elements are found in living organisms and are bioelements. However human body has 16 of these.

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Answer # 3

Only 6 of the bioelements constitute about 99% of the protoplasm so called major bioelements and those which are less than 1% of protoplasm are called minor bioelements - The bioelements combined with each other to form thousand of different bio-molecules that may be organic

in organic -

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Answer # 4

The four biological molecules

are ① carbohydrates ② protein ③ nucleic acid

④ lipids → Found in simplest prokaryotic cell as well in most adv. mammalian cell.

→ important for maintenance of cell structure and their specific metabolic activities.

→ Carbohydrates are present in the cytoplasm of the cell act as a fuel for metabolic activities of the cell.

→ Protein are present in the membranes, ribosomes, cytoskeleton and enzymes of cell.

→ Lipids are present in the membrane and cytoplasm of the cell. They provide reserved energy source, shape, protect and insulate cell.

→ Nucleic acid are RNA and DNA

Answer # 5

This is due to high polarity of water. The sharing of electrons between oxygen and hydrogen is not completely equal so the covalent bond is polar.

Answer #6

This is the polarity of water that makes it an universal solvent for polar substances. Ionic compounds or electrolytes can be easily dissolved in water.

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Answer # 7

- Because of hydrogen bonding, water is a liquid at temperature suitable for life.
- The high cohesion and adhesion forces of water is due to the presence of hydrogen bond in water, which in turn makes water as transport medium.

Answer # 8

Water has relatively a very high heat capacity than any other substance due to its hydrogen bonding because much of the heat absorbed by water is utilized in the breakdown of hydrogen bonding therefore it does not manifest itself to raise the temperature of water hence, very large amount of heat can increase very little temperature in water.

Answer # 9

Due to the high specific heat capacity of water it works as temperature

stabilizer or regulator for organisms in the hot environment and hence protects the living material against sudden thermal changes.

Answer # 10

This is high heat of vaporization of water that gives animals an efficient way to release excess body heat in hot environment. When an animal sweats, body heat is used to vaporize the sweat thus cooling the animal.

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Answer # 11

Carbohydrates are commonly known as sugars or saccharides as most of the familiar carbohydrates are sweet in taste. Classification of carbohydrates is based upon number of saccharide units - they are classified into three groups - monosaccharides ② disaccharides ③ polysaccharides.

Answer # 12

Classification of monosaccharides is based upon functional group and number of carbon atoms.

on the basis of functional group : The monosaccharides containing aldehyde are called aldoses, while

Those containing ketone are called ketoses.

Based on carbon atoms it is classified into five groups based on no. of carbon atoms

- ① trioses 3C ② tetroses 4C ③ pentoses 5C
- ④ hexoses 6C ⑤ heptoses 7C

Answer # 13

Aldo pentose ribose ($C_5H_{10}O_5$)

ribose can exist in open chain structure in dried form but it consist in ring structure in aqueous solution. When they dissolve in water, the oxygen atom from aldehyde group reacts with second last carbon C_4 in case of ribose. In this way oxygen atom forms a link between $C1$ and $C4$ in case of ribose.

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Answer # 14

