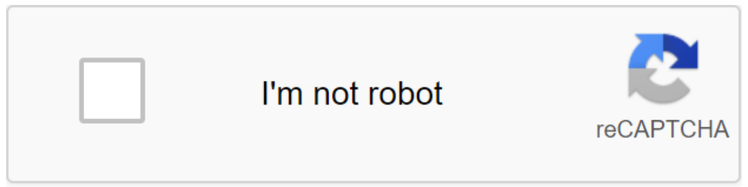

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Biological molecules notes pdf igcse

Notes to the subject of CIE IGCSE biology: 4. Biological molecules. They were made in accordance with the specification and cover all relevant topics in the training programme for consideration in May/June, as well as in October/November and March4. Biological Molecules Revision Notes: A list of chemical elements that make up: Carbohydrate Fats Proteins All three biomolecules contain carbon, hydrogen and oxygen. Proteins also contain nitrogen. Proteins sometimes contain sulfur and phosphorus too. The state that large molecules are made from small molecules is limited: starch and glycogen from glucose proteins from amino acids fats and oils from fatty acids and glycerol polymers are large molecules from small, similar molecules (often called subunitions). In the case of carbohydrates, starch and glycogen are large molecules of polymer from glucose. Note: The simplest sugar is a glucose molecule (C6H12O6). In the case of proteins, amino acids are monomers. Different amino acids are linked to each other to form chains known as peptides. The bonds between these amino acids are known as peptide bonds. These peptides come together to form proteins such as enzymes. The most common type of fat and oils are triglycerides. Triglycerides consists of three fatty acid molecules, linked to the glycerol molecule. The link between fatty acid and the glycerol molecule is known as ester bond. Because the units in fats and oils are not all similar, they are not known as polymers - they are not made from similar units (fatty acids and glycerol are quite different, in fact). fats are triglycerides that are solid at rtp (room temperature and pressure). Remember that rtp is a temperature of 20oC and a pressure of 1 asm. The oils are liquid at rtp. Describe the use: Iodine solution to test for starch This test is super easy! All you have to do is add a few drops of iodine to the test solution/test material. If it contains starch, the solution will become blue-black, if not, it will remain orange-brown (color of iodine). Benedict's solution for testing to reduce sugar to a known volume of test solution, you add an equal amount of Benedict/solution reagent. Let it stir and look for any color changes. If not, try to heat it in a warm water bath (about 80oC), and look for any color changes. If there is no change, there is no reduction in sugar in the solution. Benedict's agent is blue. If there is any sugar present, it will change from blue to green, yellow, orange, red (fire colors). Green means that there are only traces of reduced sugar and red means that the solution has a high concentration of sugar reduction. Note: Sucrose is not a reduction in sugar. Biureth reagent is a mixture of two chemicals - copper sulfate (CuSO4), mixed with sodium (NaOH) or potassium hydroxide (KOH). Teh Teh The test is done to show the presence of peptide bonds. Remember that peptide bonds are the link that bind amino acids together in protein. If peptide bonds are present, the blue bioretal reagent will turn into mauve or purple. To complete the test, simply add the biuret reagent to the test solution. (Note if the test material is solid rather than liquid, crush it and mix it with distilled water to form a solution). The volume of the biorete added should be the same as the amount of test solution you add it to. In some cases, you will not get a ready-made solution of mixed bioretal reagents. In this case, measure the known amount of test solution into a test tube. About 1 cm3 should be enough. Add the same volume of NaOH (or KOH) to the test tube and stir. Add a few drops of CuSO4 solution, shaking after each drop. After the test is complete, watch the color of the solution. If it is mauve or purple, there are peptide bonds in the solution, so there are probably proteins in the solution. Ethanol emulsion test for fats and oils This test is pretty simple too! You add a test sample to a concentrated ethanol solution. You put the resulting mixture in a viruous distilled water, close it, and shake it around. Cloudy emulsion produces fat; If not, there is no fat.

The condition that water is important as a water solvent is extremely important as a solvent. All reactions in our body occur in water, our cells 70% of water on average, substances are transported around our body after dissolving in water, etc. so water is essential for life. Notes submitted by Sarah Illustrations of Azmina Click here to move on to the next topic. Click here to go to the previous theme. Click here to return to the science menu. You have studied the section of biological molecules in some detail I would imagine perhaps in more detail than is absolutely necessary for the specification. This post is designed to help you focus your understanding on those points that are likely to be tested in iGCSE issues. Here goes ... You have to understand some chemistry for this topic to make sense. In particular, you have to understand what is meant by the following terms: the compound of the atom molecule My personal definitions will be as follows: Atom: the smallest particle that preserves the chemical properties of the element - a structure made up of protons, neutrons and electrons Molecule: a particle of two or more atoms chemically linked together - can contain only one type of atom or several elements : a substance in which all atoms are the same and the same compound : A substance containing more than one type of item Back to safer land..... Living organisms are made from a small group of molecules. The most common molecule in each organism is water, and in humans water is about 70% of the mass. But if you remove all the water, the water, For just dry mass, the most common molecules can be grouped into proteins, lipids, carbohydrates and nucleic acids (e.g. DNA) Carbohydrates contain only three elements - carbon, hydrogen and oxygen lipids (fat and oils) contain three elements - carbon, hydrogen and oxygen proteins contain four or five elements - carbon, hydrogen, oxygen, nitrogen, and sometimes sulphur. , consists of a long chain of repetitive subunides (so-called monomers) Carbohydrates are grouped into three main types: simple sugars such as glucose or fructose - they are called monosachroids. Some sugars like sucrose are made from two simple sugars combined - they are called disaccharides Some carbohydrates are macromolecules (polymers) from many hundreds of sugar residues combined - they are called polysaccharides. In the diagram above, you can see three important polysaccharides in living organisms. All three polymers have glucose sugar, but the location of glucose residues is different. Cellulose is the main component of plant cell walls. Starch is the storage of polysaccharide found in plants and glycogen similar to the storage molecule in the liver and muscle tissue in animals. Glucose is detected by the Benedict test. Heat the solution with Benedict's, reagent to 90 degrees for 5 minutes. A positive glucose test is a brick red color. Starch is tested for the use of iodine solution (in potassium iodide) iodine solution becomes blue-black in the presence of starch. Proteins are also polymers, but this time a separate monomer is not sugar, but a molecule called amino acid. This protein is then folded into a complex 3D shape, using a whole load of weak bonds that can be easily broken at high temperatures. This is why enzymes made from protein are denature at high temperatures. There are 20 different amino acids that can be incorporated into the protein, so there is an almost limitless variety of different proteins that can be made. Lipids are a group of water-repellent molecules that again contain C,H and O atoms. Previously, they were divided into fats and oils depending on whether they are solid (fat) or liquid (oil) at room temperature. Many lipids are a type of molecule called triglycerides, and this is made from a single glycerol molecule attached to three fatty acids of the tails. The biological molecules of carbohydrates are made of carbon, hydrogen and oxygen. They are used as a source of energy for the body. There are three types of carbohydrates: monosaccharides, dysaccharides and polysaccharides. Monosaccharides (i.e. glucose) are the simplest form of sugar. They are one unit and they cannot be broken down further to make a simpler sugar. literally two monosaccharides united. Polysaccharides are large chains of monosaccharides, combined starch is a polysaccharide of large chains of glucose and glycogen cellulose is a polysaccharide of large chains of glucose fats / oil fats made from carbon, hydrogen and oxygen. Oxygen content is lower than in carbohydrates. Fats have different targets in the body: Energy Source. In fact, they have twice as much energy as carbohydrates! The thermal insulation of the Myelin shell forming a cell membrane forming fats consists of three fatty acid units attached to one unit of glycerol: Protein proteins are made from carbon, hydrogen, oxygen, nitrogen, and sometimes sulfur or phosphorus. They are extremely important to the body and serve many different functions. Here are a few: Growing tissue repair cell membranes forming Energy Source Proteins are made from long chains of amino acids chemically linked to each other. There are about 20 different amino acids that are found in the human body. Different combinations of these amino acids will lead to different proteins. For example, each of the different colored circles are different amino acids. They are connected in a certain sequence, as shown below: It is really important to understand here that the final 3D structure of the protein is derived from specific interactions between amino acids that are linked in the protein chain. Thus, the sequence of amino acids in the chain creates the final shape of the protein, and the shape gives the protein its function. This diagram below shows how a single chain of amino acids will eventually turn into a complex 3D protein structure with a specific function. For example: Consider amino acids A B C D and E. Hyphens are a chemical link between amino acids. Protein 1: A-B-C-D-E Protein 2: A-C-B-D-E In the above example, protein 1 has amino acids A to E, connected in order. Protein 2, on the other hand, has a slightly different amino acid sequence. Just because of this small difference in amino acid order, protein 2 will be completely different from protein 1 in terms of its function and structure. It is super important for you to understand. Food testing We can test for starch, monosaccharides, proteins and fats in this sample using the following tests: Starch Starch Test Add a few drops of iodine solution Blue /black coloring means that starch is present test Benedict Monosaccharide test Add an equal amount of solution of benedict in the solution of food and cook gently change color (from blue) means the presence and amount of monosacchrides Biuret test Protein test Add an equal amount of sodium hydroxide to the food solution and mix Add a few drops of 1% copper sulfate purple color means the presence of protein The Fat Test test dissolves food in ethanol and pours the solution into a clean tube of water White emulsion means the presence of a fat structure of DNA, as you already know, genetic information is stored inside our DNA. While you don't need to go into full depth with this, CIE wants you to understand the overall structure of the DNA molecule: So, above all, DNA has a double spiral structure which has two strands spiraled together. Each thread has chemicals called bases. The double helix is held together through pairs of bases that draw to each other from one strand to another. The bases will always mate the same way. Adenin (A) will always be paired with Timin (T). Cytosine (C) will always be paired with Guanine (G). The chart above shows this pairing (i.e. green is always associated with purple, and pink is always associated with blue). Water CIE wants you to understand the importance of water. Indeed, water is essential to the human body for many things. One such thing is the fact that water is an important solvent. This means that nutrients and waste can be dissolved in water so that it can be transported throughout the body. In addition, most of our chemical reactions inside our body are controlled by enzymes. Enzymes cannot work if they do not dissolve (i.e. if water is present). water). biological molecules notes pdf igcse