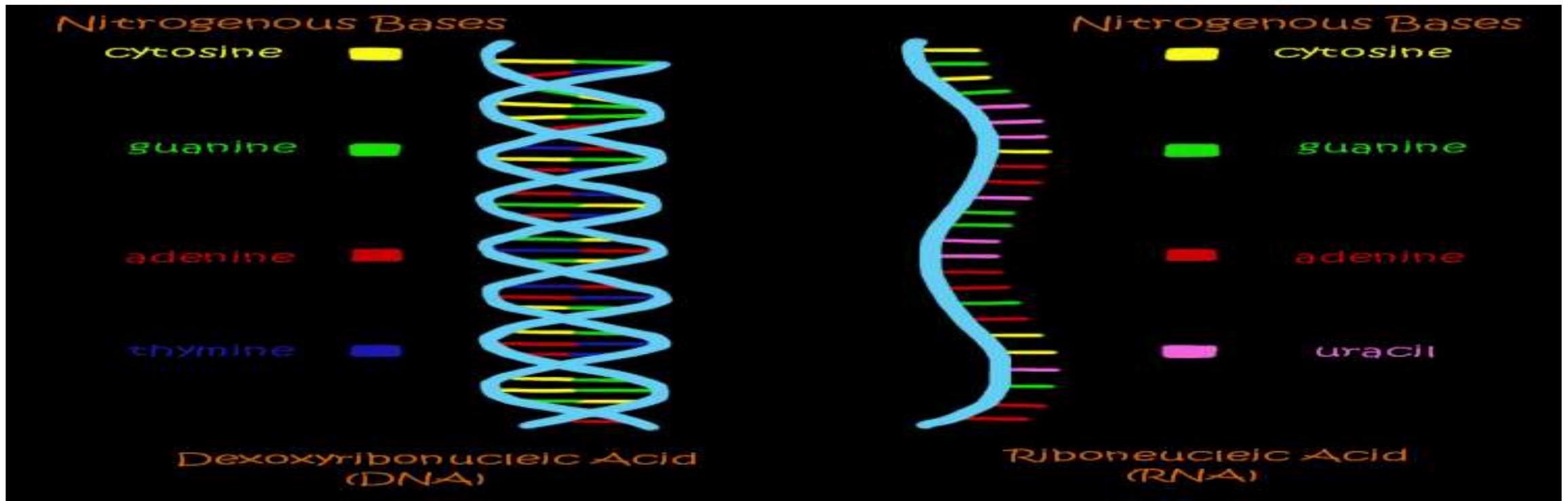


NUCLEIC ACIDS: DNA & RNA

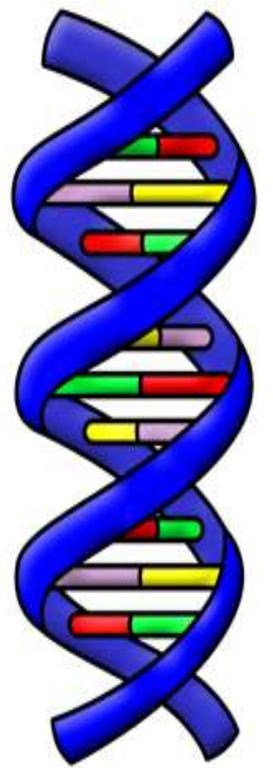
- Nucleic Acid **monomers** (building blocks) are groups of chemicals called **NucleoTides**, each of them made with C, H, O, N, and P.
- These NucleoTides join each other to form long strands.
- Within each NucleoTide, is a Sugar.



THEIR DETAILS

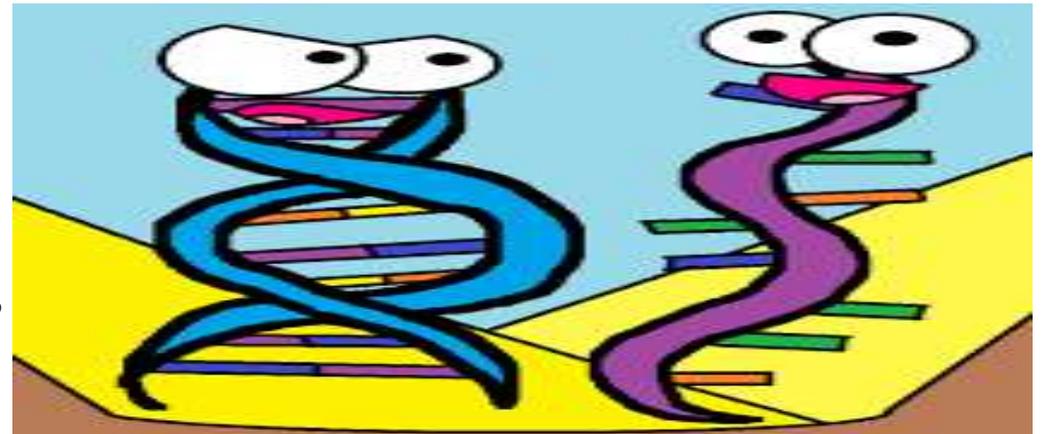
DeOxyRibo-NUCLEIC ACID (DNA)

- DNA molecules have a **DeOxyRibose** Sugar.
- They form a twisted double strand (like a twisted ladder).
- They are found in the Nucleus, and control their own cell.
- They also carry the plan of the entire body in **each** nucleus.
- They **control** the making of RNA (and Proteins) in the body.



Ribo-NUCLEIC ACID (RNA)

- RNA molecules have a **Ribose** Sugar.
- They occur in single strands.
- Some are in the Nucleus. Others are in the Cell's Cytoplasm.
- They are controlled by the DNA to **make** all the body's Proteins.



FOOD TESTS: PRACTICALS

To Test for CARBOHYDRATES

1. To test for Glucose, you put in a mixture of *Fehlings A & B* (or you use *Benedict's*), and heat it. If it changes colour from **blue** to **orange**, that food has glucose in it.
2. To test for starch, you put a few drops of Iodine in the food. If its colour changes from **brown** to **black**, then it contains starch.



To Test for LIPIDS

Mix the food in alcohol. Pour it onto filter paper and let the alcohol evaporate. If an **oily patch** remains, then that food contains fats or oils.

To Test for **PROTEINS**

1. Sodium Hydroxide (NaOH) and Copper Sulphate (CuSO₄) are mixed for the ***Biuret Test***, and are added to the food. If it turns from **blue** to **violet**, it contains Proteins.



2. A mixture called **Millon's Reagent** is added to the food, and heated. If it changes from **transparent** to **red**, then it contains Proteins.

TEMPERATURES affecting **ENZYME** ACTIVITY

In the experiment, enzymes were in the liver. When the liver had first been boiled at high temperatures, the whole shape of the enzymes was changed – the enzymes were DeNatured. They were thus unable to do the job (which they **could** do in TestTubes 1 and 4).

LIFE AT THE MOLECULAR, CELLULAR AND TISSUE LEVEL

A. CHEMISTRY OF LIFE

Question 1

1. Organic substances are compounds that contain the element carbon, usually bonded with Hydrogen.

Inorganic substances do not contain the element carbon except for carbon dioxide and carbonates.

2. Plants need water for photosynthesis.

Animals need water for nutrition.

Water provides a medium for chemical reactions.

3. REFER TO STUDY GUIDE



4. Micronutrients - nutrients that are required in small quantities by the body.

Macronutrients – nutrients that are required in large quantities by the body.

5. Plants take up minerals from the soil

Farmers use fertilisers to enrich the soil with nutrients



6. The excessive use of fertilisers results in some of it being washed into rivers and streams and dams. This high levels of phosphates and nitrates in the water causes the rapid growth of algae and other plants. The extensive growth of plants on the surface of the water prevents sunlight and gases from reaching the plants below the water surface. This causes the death and decomposition of the plants. Decomposition decreases the oxygen levels in the water causing aquatic animals to die.

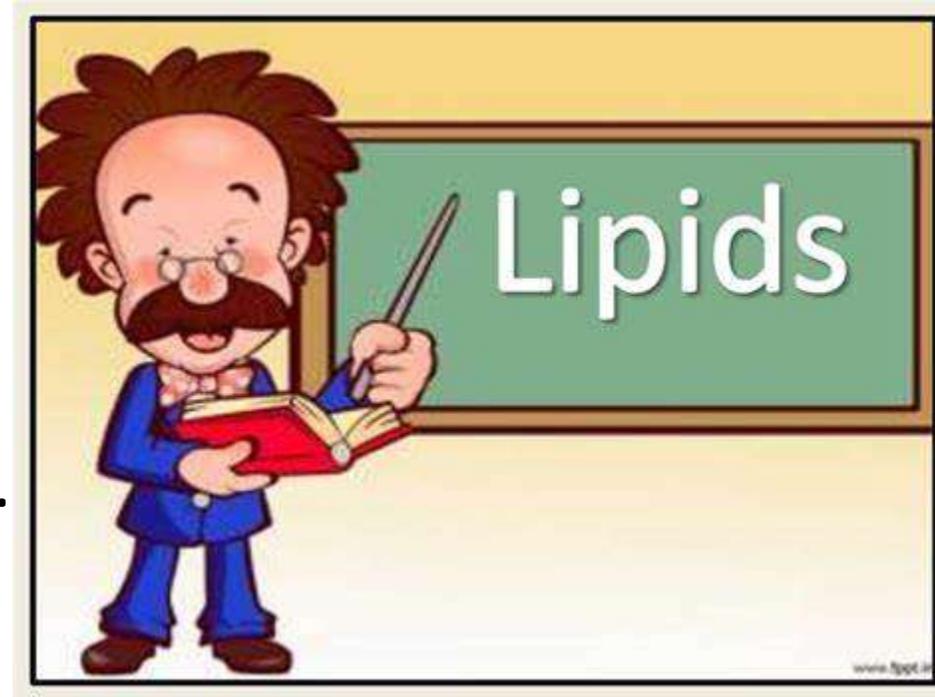
Question 2

1. Hydrogen, oxygen and carbon.
2. 2:1
3. Monosaccharides e.g. glucose, fructose.
Disaccharides e.g. maltose, sucrose.
Polysaccharides e.g. starch, cellulose.
4. Bread, rice, flour, potatoes, fruit, pasta.
5. Important source of energy.
Cellulose forms the cell walls of plants.
Can also be stored as a reserve source of energy.



Question 3

1. Carbon, hydrogen, oxygen.
2. a. Saturated fats have a single bond in the fatty acid chains.
Unsaturated fats have one or more double bonds in the fatty acid chains.
b. Fats are generally solids at room temperature.
Oils are generally liquids at room temperature.
3. REFER TO STUDY GUIDE
4. Butter, margarine, oil, meat, certain fish(sardines).
5. Important source of reserve energy.
Acts as an insulator in the body, preventing loss of heat.
Seeds store fats in the form of oils.



Question 4

1. Carbon, hydrogen, oxygen, nitrogen.

2. Sulphur, phosphorus, iron.

3(a) High temperatures denature the protein which then lose their function and shape.

(b) Low temperatures deactivate the proteins.

4. Amino acids .

5. Required for the growth and repair of tissue.

Enzymes and hormones are protein in nature.

Haemoglobin which transports gases in the blood is a type of protein.

Forms part of cell membrane structure.



Question 5

- a. B, C
- b. A, E
- c. B, C, D
- d. A, C, E

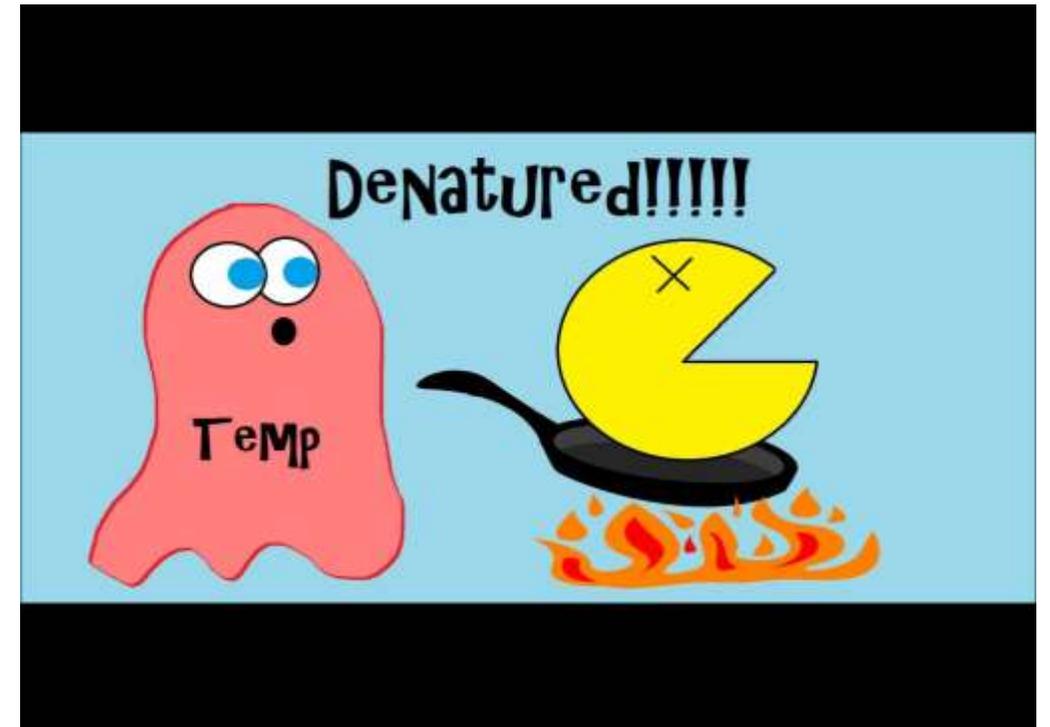


Question 6

- 1. Enzymes are protein molecules that speed up chemical reactions in living organisms.
- 2. Enzymes are not used up in a chemical reaction.
- 3. Photosynthesis, cellular respiration.

Question 7

- 1. Specific.
- 2. Disaccharide.
- 3. Products.
- 4. It retains its shape and remains unchanged.
- 5. Temperature, pH.



Question 8

1. Human body optimum temperature of the enzyme is 37°C , which is human body temperature.
2. $35\text{-}42^{\circ}\text{C}$
3. 32 %
4. High temperatures denatures the enzyme which then loses its ability to function.
5. Low temperatures inactivates the enzyme.

Question 9

1. DNA, RNA.
2. Nucleotides.
3. Form a double helix.
4. Carries hereditary characteristics, important in the synthesis of proteins.
5. Single strand of nucleotides.
6. Plays a role in protein synthesis.



Question 10



REFER TO STUDY GUIDE