

Knowledge check

Subject area: Organic chemistry

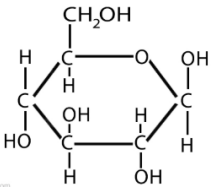
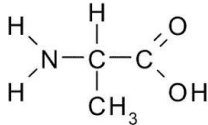
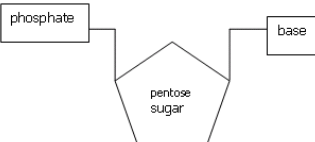
Level: 14–16 years (Higher)

Topic: Natural polymers

Source: rsc.li/3iF4Lvm

1. The table shows some naturally occurring monomers that can form polymers.

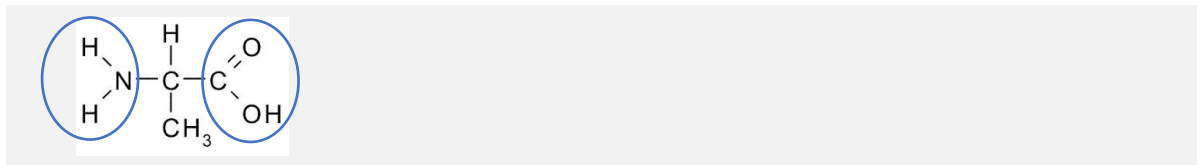
a) Complete the table.

			
Name of type of monomer	<i>Answer: Sugar.</i>	<i>Answer: Amino acid.</i>	<i>Answer: Nucleotide.</i>
Name of polymer type	<i>Answer: Starch or cellulose.</i>	<i>Answer: Protein.</i>	<i>Answer: DNA.</i>

b) What is a functional group in a molecule?

Answer: A part of the molecule that determines how it reacts (its chemical behaviour).

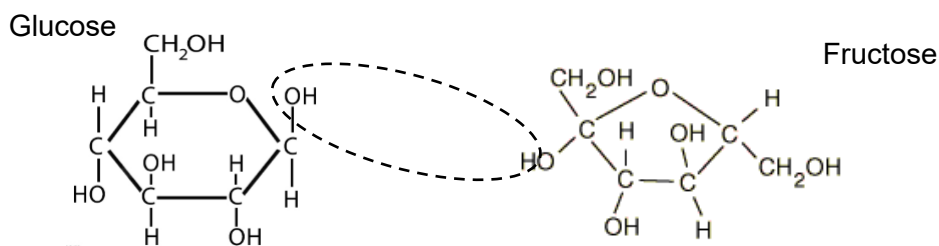
c) Circle the two functional groups in this molecule:



2. Sucrose is a sugar called a disaccharide.

This means that it is made of two sugar molecules joined together.
Sucrose is made from two other sugars called glucose and fructose.

Here are the structures of glucose and fructose:



- a) Use the molecular structures of glucose and fructose to write their molecular formulas:

Glucose	<i>Answer: C₆H₁₂O₆.</i>
Fructose	<i>Answer: C₆H₁₂O₆.</i>

- b) On the diagram above, a dotted ring has been drawn around parts of the glucose and fructose molecules. This shows that a small molecule will be formed.

What is the name of this small molecule?

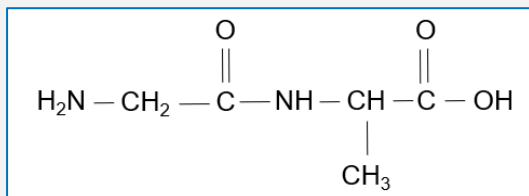
Answer: Water.

- c) Using the information in this question, write down the formula of the disaccharide formed called sucrose.

Answer: C₁₂H₂₂O₁₁.

e) The dipeptide in part c) can be abbreviated to ala-gly.

i) Draw the structure of gly-ala.



ii) Using your answers to part i) and part c), is ala-gly the same dipeptide as gly-ala? Give a reason.

*Answer: Ala-gly is not the same as gly-ala.
The dipeptides are not symmetrical, and so the ordering makes a difference.*

4. This question is about the structure of DNA.

Use some of the words from the box to complete the sentences below.

condensation	helix	polynucleotide	addition
intermolecular	four	water	nucleotide
ring-shaped	ionic	six	hydrogen chloride

DNA is an important polymer essential for life.

Monomers called *nucleotides* make DNA.

There are *four* different types of monomer.

When the nucleotide monomers join together to form DNA they also form *water*.

This means that this type of reaction is called a *condensation* polymerisation.

The DNA strand is made of a double *helix* of two very long *polynucleotide* strands that run in opposite directions.

These strands are held to each other by *intermolecular* forces.