

Biological Molecules

Question Paper

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Biological Molecules
Sub Topic	
Booklet	Multiple Choice
Paper Type	Question Paper

Time Allowed : **33 minutes**

Score : **/ 27**

Percentage : **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- 1 A student carried out four tests for biological molecules on a solution. The observations are shown in the table.

test for biological molecules	observation
iodine solution	orange
biuret	purple
Benedict's	orange
emulsion	cloudy

Which molecules may be present in this solution?

- A** glucose, starch, protein
B lipid, protein, glucose
C protein, starch, sucrose
D starch, protein, lipid
- 2 Solutions of biological molecules are tested for sugars. The table shows the colours of the solutions after testing.

solution	heated with Benedict's solution	boiled with hydrochloric acid, neutralised, then heated with Benedict's solution
1	blue	orange
2	green	green
3	yellow	red

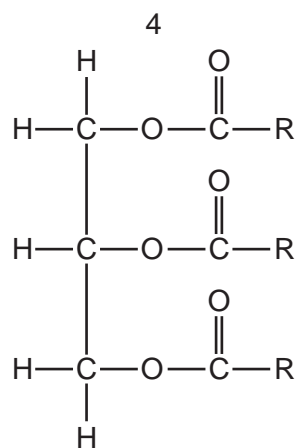
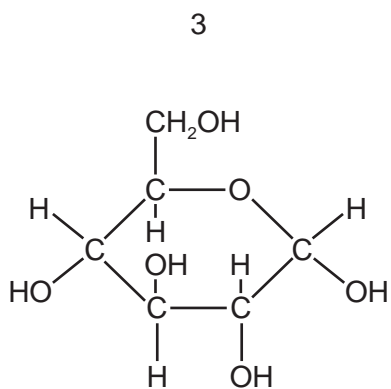
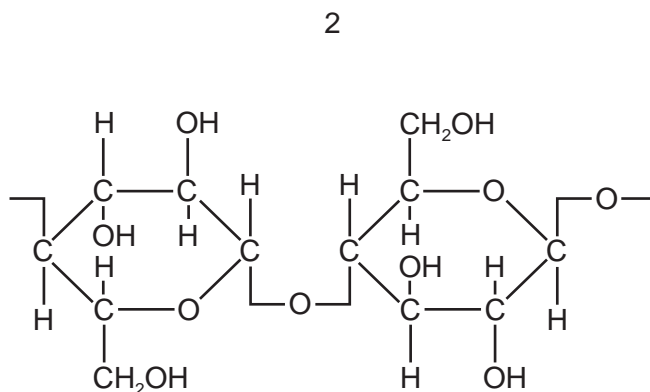
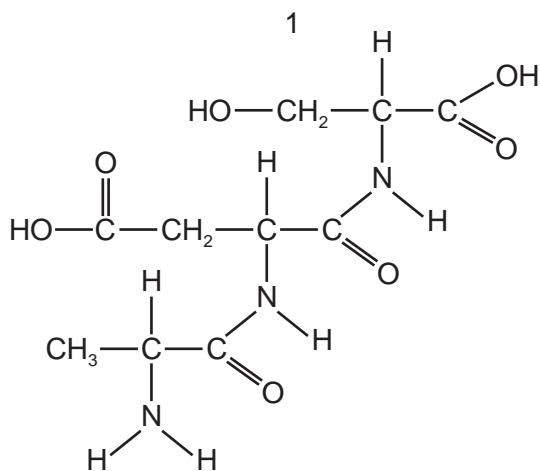
Which may contain non-reducing sugars?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

3 A student carried out four tests for biological molecules. The observations are shown in the table.

test	observaion
iodine	orange
biuret	purple
Benedict's	orange
emulsion	clear

Which molecules are present in the solution?



A 1 and 2

B 1 and 3

C 2 and 3

D 3 and 4

- 4 A student carried out four tests for biological molecules on a solution. The results are shown in the table.

test for biological molecules	observation
iodine solution	orange-brown
biuret	purple
Benedict's	orange
emulsion	clear

Which three molecules may be present in this solution?

- A** glucose, starch, globin
B globin, glucose, collagen
C starch, sucrose, collagen
D sucrose, globin, collagen
- 5 Four sugar solutions were tested with Benedict's solution. The table shows the colour of the solutions after testing.

solution	colour
1	green
2	blue
3	brick red
4	yellow

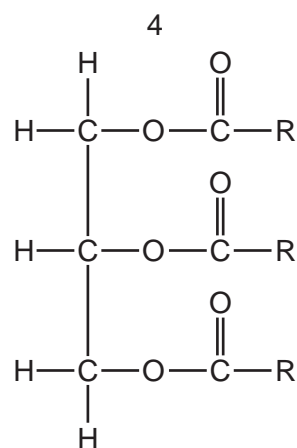
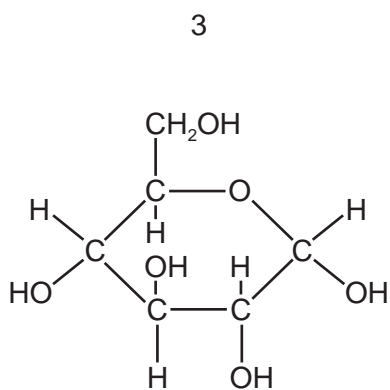
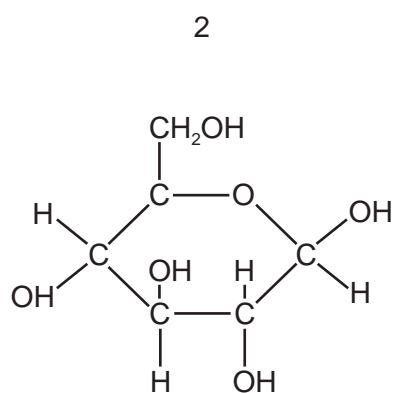
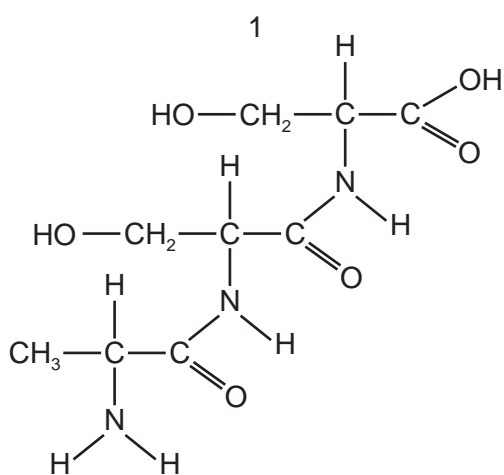
What is the best interpretation of the results?

	solution 1	solution 2	solution 3	solution 4
A	0.05% reducing sugar	0.5% non-reducing sugar	1.0% reducing sugar	0.1% reducing sugar
B	0.5% reducing sugar	0.0% reducing sugar	1.0% reducing sugar	0.1% reducing sugar
C	1.0% reducing sugar	1.0% non-reducing sugar	1.5% reducing sugar	0.5% reducing sugar
D	0.05% non-reducing sugar	0.5% reducing sugar	1.0% non-reducing sugar	0.1% non-reducing sugar

- 6 A student carried out four tests for biological molecules on a solution. The results are shown in the table.

test for biological molecule	observation
iodine solution	orange
biuret	blue
Benedict's	orange
emulsion	clear

Which molecules are present in this solution?



- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

- 7 Two solutions, 1 and 2, one containing starch and sucrose, and the other containing glucose and protein, were tested with a variety of reagents to confirm their identity.

The table shows the conclusions from the results recorded for the various tests.

Which row identifies the two solutions?

	add iodine solution		boil with Benedict's solution		boil with Benedict's solution after acid hydrolysis		add biuret solution		key
	1	2	3	4	5	6	7	8	
A	+	–	+	–	–	+	–	+	+ = biological molecule present
B	–	+	+	–	+	–	–	+	– = biological molecule absent
C	+	–	–	+	+	–	–	+	
D	–	+	+	–	+	+	+	–	

- 8 Tests were performed on samples from a mixture of biological molecules.

When iodine in potassium iodide solution was added to a sample, the mixture turned black.

When the biuret test was carried out on another sample, the mixture turned purple.

Which biological molecules were in the mixture?

- A** amylase and starch
- B** cellulose and starch
- C** phospholipid and cellulose
- D** starch and phospholipid

- 9 A student carried out a series of tests on an extract from a plant.

The table shows the results of the tests.

reagent	observation
ethanol and water	white emulsion
Benedict's solution	brick red precipitate
Biuret	blue colour

Which row shows the molecules found in the plant extract?

	protein	fatty acids	reducing sugar
A	✓	✓	✓
B	x	✓	✓
C	x	✓	x
D	x	x	✓

key

✓ = present

x = absent

- 10 Which carbohydrate gives a brick red colour when heated with Benedict's solution?

- A cellulose
- B fructose
- C glycogen
- D sucrose

- 11 Four different fruit juices, **A**, **B**, **C** and **D**, were tested with Benedict's solution. A second sample of each juice was hydrolysed and tested with Benedict's solution. The table shows the masses of the precipitates formed.

Which juice contains the greatest mass of non-reducing sugar?

	mass of precipitate before hydrolysis / mg	mass of precipitate after hydrolysis / mg
A	30	55
B	55	55
C	65	85
D	70	80

12 A student tested four samples of food, **A**, **B**, **C** and **D**, for the presence of

- lipids
- protein
- reducing sugars
- starch

One of the food samples, milk, was found to contain lipid, protein and reducing sugar.

Which of the food samples, shown in the results below, is milk?

sample	observation			
	adding biuret reagent	adding iodine in potassium iodide solution	boiling with Benedict's solution	mixing with ethanol and adding to water
A	lilac	orange	orange precipitate	milky emulsion
B	lilac	blue-black	blue	milky emulsion
C	pale blue	blue-black	orange precipitate	clear
D	pale blue	orange	blue	clear

Save My Exams! – The Home of Revision

For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/

Save My Exams! – The Home of Revision

For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/

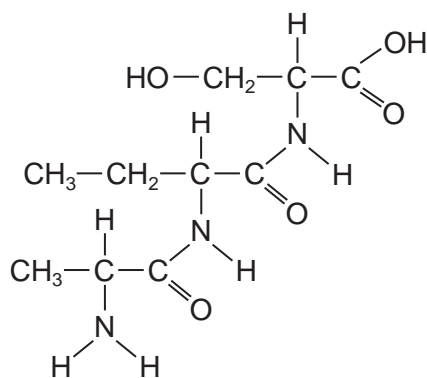
13 Which sequence correctly identifies the change in colours during the Benedict's test?

- A blue → brown → red → green → yellow
- B blue → green → yellow → brown → red
- C blue → red → green → yellow → brown
- D blue → yellow → brown → red → green

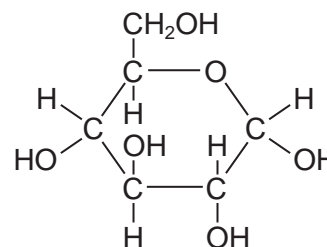
14 Samples of a food were tested using Benedict's reagent, biuret solution and ethanol. After testing, the solutions were blue with Benedict's reagent, purple with biuret and cloudy with ethanol.

Which molecules do the samples contain?

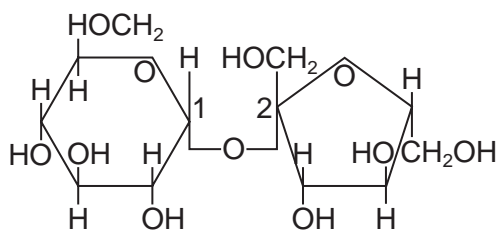
W



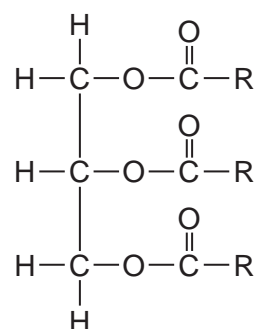
X



Y

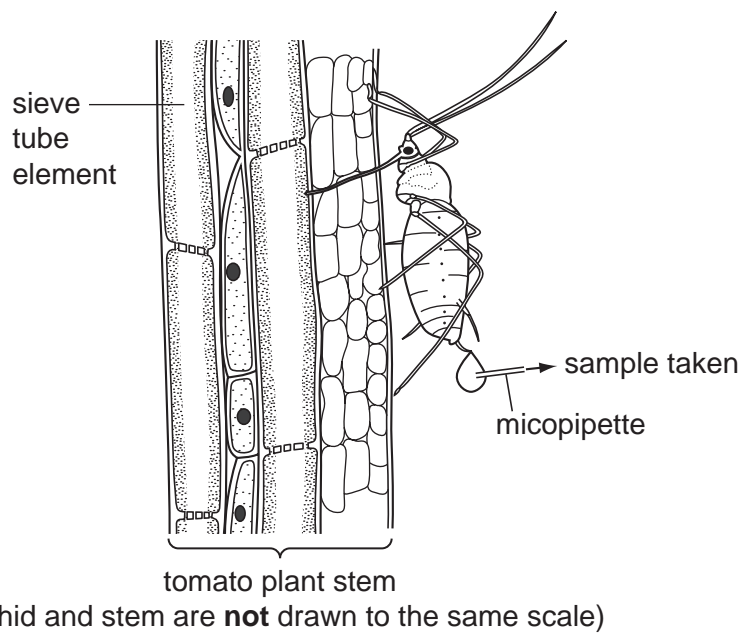


Z



- A W, X and Z
- B W, Y and Z
- C W, X and Y
- D X, Y and Z

- 15 A large number of aphids were used to collect samples of the contents of the sieve tubes of a tomato plant.



Different samples of the sieve tube solution were tested.

Which was the correct result?

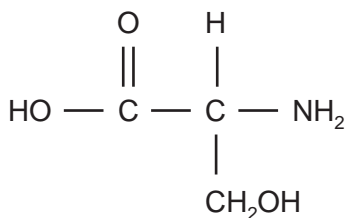
	Benedict's test		iodine in KI
	before hydrolysis	after hydrolysis	
A	blue	red	brown
B	blue	blue	blue / black
C	red	blue	blue / black
D	red	red	brown

16 A solution of starch is mixed with a solution of amylase.

Which reagent should be used to confirm that a reaction had taken place and what would be the appearance of the mixture when the reaction was complete?

	reagent	the appearance of the mixture
A	Benedict's solution	brick-red
B	biuret solution	blue
C	ethanol	cloudy
D	iodine in potassium iodide solution	blue-black

17 The diagram shows a molecule.



Which test on a polymer of this molecule would give a positive result?

- A** adding biuret solution
- B** adding iodine in potassium iodide solution
- C** heating with Benedict's solution
- D** shaking with ethanol then pouring into water

- 18 Four sugar solutions were tested with a standard Benedict's solution. The table shows the colour of the solutions after testing.

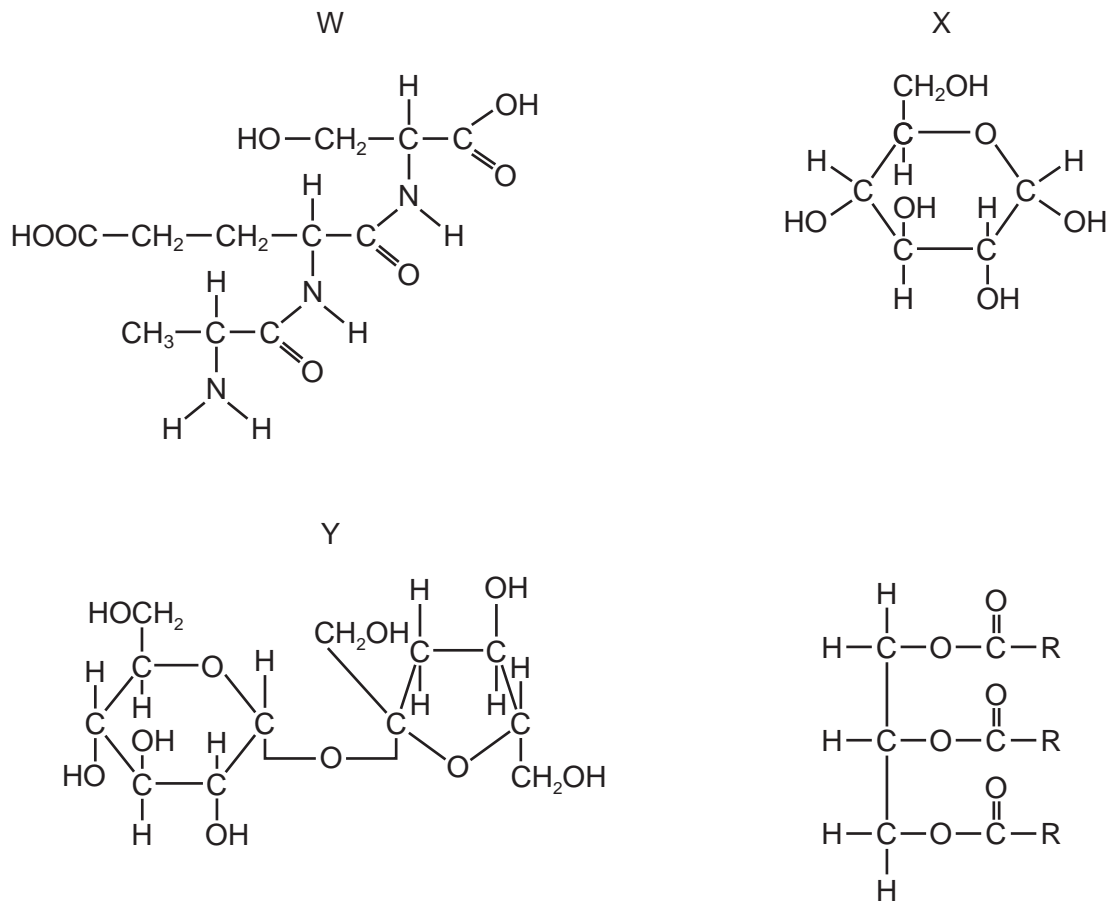
solution	colour
1	green
2	blue
3	brick-red
4	yellow

What is the best interpretation of the results?

	solution 1	solution 2	solution 3	solution 4
A	0.05% reducing sugar	0.5% non-reducing sugar	1.0% reducing sugar	0.1% reducing sugar
B	0.5% non-reducing sugar	0.05% reducing sugar	0.1% reducing sugar	1.0% reducing sugar
C	1.0% reducing sugar	1.0% non-reducing sugar	1.5% reducing sugar	0.5% reducing sugar
D	1.0% non-reducing sugar	0.5% reducing sugar	0.5% non-reducing sugar	0.1% non-reducing sugar

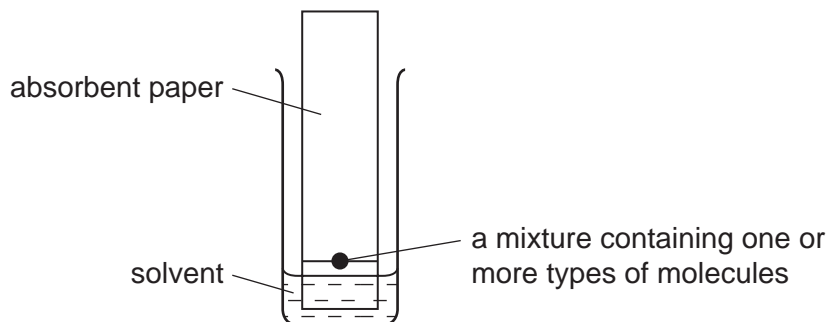
- 19 Samples of a mixture of biological molecules were tested using Benedict's reagent, biuret solution and ethanol. After testing, the solutions were blue with Benedict's reagent, purple with biuret and cloudy with ethanol.

Which molecules could the mixture contain?



- A** W, X and Y
B W, X and Z
C W, Y and Z
D X, Y and Z

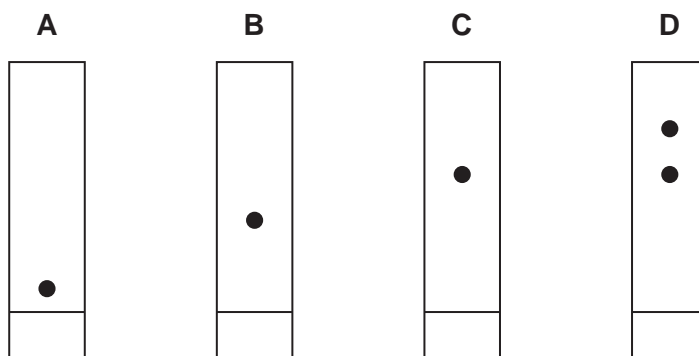
- 20 Chromatography is a technique used to separate molecules by their solubility. The diagram shows one apparatus used for this technique.



As the solvent rises up the paper, the molecules with the greatest solubility in the solvent travel a fixed distance up the paper. When the solvent reaches the top of the paper, the paper is removed, dried and sprayed with a dye. The different molecules appear as coloured spots.

Chromatography was carried out on four different carbohydrates; sucrose, cellulose, the products of hydrolysis of sucrose and the products of hydrolysis of cellulose.

Which diagram shows the presence of the products of sucrose digestion?



- 21 Four students, 1, 2, 3 and 4, each carried out the reducing sugar test and the non-reducing sugar test on a sucrose solution.

Which observations demonstrate that they carried out the correct tests?

student	observations for reducing sugar test	observations for non-reducing sugar test
1	no colour change	changed colour
2	no colour change	red
3	blue	changed colour
4	blue	red

- A** 2 only
B 3 only
C 4 only
D 1, 2, 3 and 4

- 22 Five biochemical tests were carried out on four unknown substances, **A**, **B**, **C** and **D**.

Following the tests, it was possible to determine the presence or absence of each of the biochemicals in each substance.

Which substance contains glucose, fat and protein?

substance	test				
	reducing sugar	non-reducing sugar	emulsion	iodine	biuret
A	✓	x	✓	x	✓
B	✓	x	x	✓	✓
C	x	✓	✓	✓	x
D	x	✓	✓	x	✓

key

✓ = present

x = absent

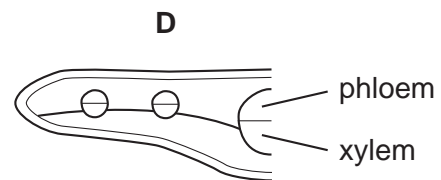
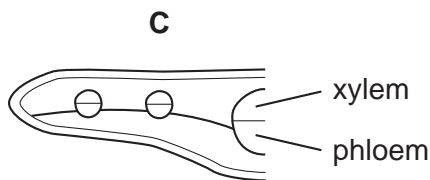
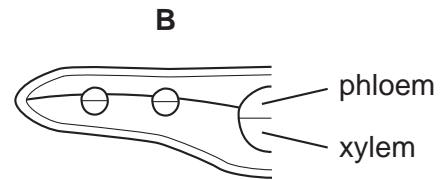
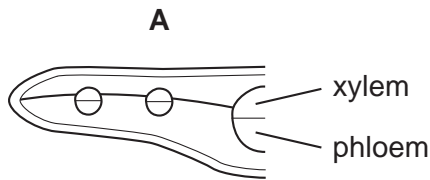
23 Tests on a liquid give these results.

test	observation
Benedict's	red
biuret	lilac
iodine in potassium iodide solution	orange

What are present in the liquid?

- A reducing sugar and protein
- B reducing sugar and starch
- C starch and protein
- D starch only

24 Which plan diagram of a transverse section of a leaf correctly shows the position of xylem and phloem as well as the fact that the palisade mesophyll is twice as thick as the spongy mesophyll?



25 Food tests are carried out on four solutions.

Which solution contains only sucrose and protein?

solution	Benedict's test	acid hydrolysis then Benedict's test	iodine in potassium iodide solution	biuret test
A	x	✓	x	✓
B	✓	✓	x	✓
C	x	✓	✓	x
D	✓	x	✓	x

key

✓ = positive result

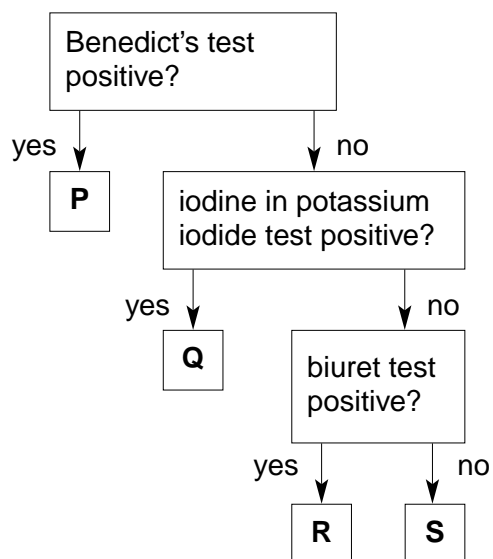
x = negative result

26 Solutions of four food substances are tested for sugars. The table shows the colours of the solutions after testing.

Which food is a non-reducing sugar?

	heated with Benedict's solution	boiled with hydrochloric acid, neutralised, then heated with Benedict's solution
A	blue	blue
B	blue	orange
C	orange	blue
D	orange	orange

27 Various substances are identified using the following procedure.



What could the four substances be?

	P	Q	R	S
A	glucose	starch	protein	lipid
B	glucose	sucrose	starch	protein
C	sucrose	protein	lipid	starch
D	sucrose	starch	lipid	protein