1. Samples of normal plasma and normal urine were analysed in a laboratory. One test is described below:

STEP 1: add 2 cm^3 of the test sample to a test tube containing solution **M** and mix.
STEP 2: place the test tube in a water bath at 90 °C.
OBSERVATION: the final colour was red.

Which is correct?

A **M** is Biuret solution and the sample is plasma
B **M** is Biuret solution and the sample is urine
C **M** is Benedict's solution and the sample is plasma.
D **M** is Benedict's solution and the sample is urine.

Your answer ☐

[1]

2. Glycogen is a complex carbohydrate found in the liver of mammals.

Which of the statements is / are true?

Statement 1: glycogen contains 1,4-glycosidic bonds between alpha glucose molecules.
Statement 2: glycogen contains 1,6-glycosidic bonds between alpha glucose molecules.
Statement 3: branches occur within the glycogen molecule by the formation of 1-6 glycosidic bonds.

A 1, 2 and 3
B Only 1 and 2
C Only 2 and 3
D Only 1

Your answer ☐

[1]

3. The water potential in the soil where potatoes are growing successfully is **–400 kPa**.

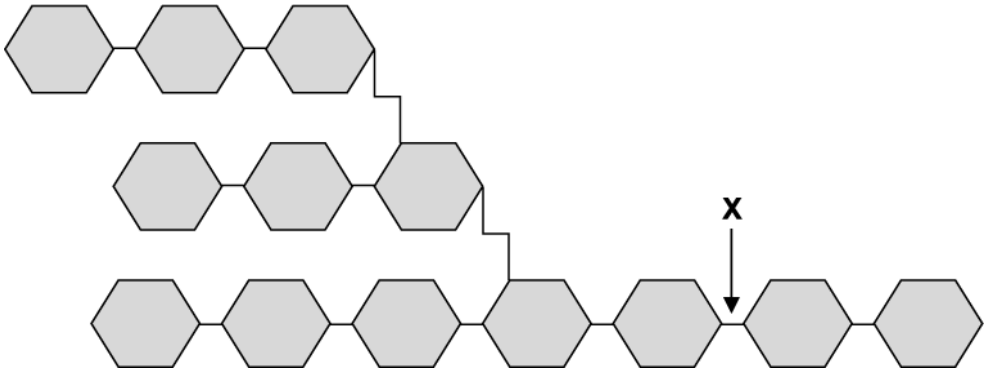
Which of the following water potential values is likely to be found in the cytoplasm of the **root hair cells** of the potato plants?

A –400 kPa
B –800 kPa
C –200 kPa
D –100 kPa

Your answer ☐

[1]

4. The diagram below represents the structure of a glucose polymer.



Which of the options, **A** to **D**, correctly describes the bond labelled **X**?

A 1,4-glycosidic bond, formed during a condensation reaction
B 1,4-glycosidic bond, formed during a hydrolysis reaction
C 1,6-glycosidic bond, formed during a condensation reaction
D 1,6-glycosidic bond, formed during a hydrolysis reaction

Your answer ☐

[1]

5. Benedict's solution can be used to detect reducing sugars in urine.

Which of the options, **A** to **D**, is the colour that you would expect to see after testing the urine of a diabetic person?

A blue
B blue-black
C brick-red
D purple

Your answer ☐

[1]

6. A student wrote the following statement:

'Water is polar because the oxygen side of the molecule is slightly positive in charge.'

Which of the following options, **A** to **D**, explains why this statement is **not** correct?

A Water must be non-polar because it can dissolve non-polar molecules like carbon dioxide.
B Water must be non-polar because it can pass through the fatty acid tails of phospholipids.
C The oxygen side of the molecule is slightly negative in charge, not positive.
D Water is not polar, it is charged.

Your answer ☐

[1]

7. Lactose is formed by a reaction between glucose and galactose, both of which have the chemical formula $C_6H_{12}O_6$.

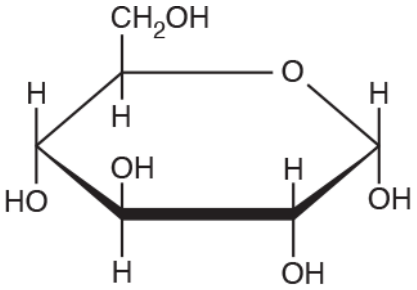
Which of the options, **A** to **D**, is the correct chemical formula for lactose?

A $C_{12}H_{22}O_{11}$
B $C_{12}H_{24}O_{12}$
C $C_{12}H_{26}O_{13}$
D $C_{12}H_{22}O_{12}$

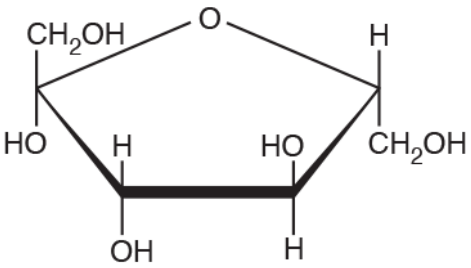
Your answer ☐

[1]

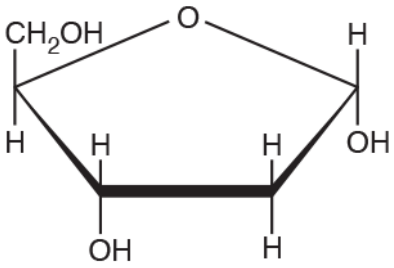
8. Which of the molecules, **A** to **D**, can be described as a pentose monosaccharide with a general formula of $C_x(H_2O)_y$?



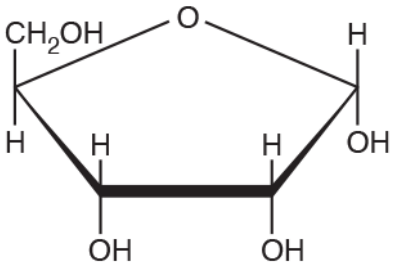
A



B



C



D

Your answer [ ] **[1]**

9. Which of the options, **A** to **D**, is an **intracellular** biofluid?

A blood plasma

B cytoplasm

C tissue fluid

D serum

Your answer [ ] **[1]**

10. A plant cell with a water potential of −500 KPa was placed in a solution which caused the cell membrane to completely pull away from the cell wall.

Which of the options, **A** to **D**, is the water potential of this solution?

A −500 KPa

B 0 KPa

C −1000 KPa

D −150 KPa

Your answer ☐ **[1]**

11. A disc of potato was cut from a tuber and dried to remove excess moisture.

It was weighed and the mass recorded as **mass 1**.

The disc was then placed in pure water for an hour, removed, dried and re-weighed as **mass 2**.

Finally, it was placed in a concentrated sucrose solution for an hour, removed, dried and re-weighed as **mass 3**.

Which of the rows, **A** to **D**, from the table below gives the expected results of the experiment?

	Mass 1 (g)	Mass 2 (g)	Mass 3 (g)
A	4.8	4.3	5.2
B	4.8	4.5	4.3
C	4.8	5.0	4.8
D	4.8	5.2	4.3

Your answer ☐

[1]

12. Three diagnostic tests were performed on a solution containing a biological molecule.

The results of the tests are shown in the table below.

	Colour of test reagent	
	Before	**After**
Benedict's test (with hydrolysis)	blue	green
Biuret test	blue	purple
Iodine test	yellow-brown	yellow-brown

Which of the options, **A** to **D**, is the biological molecule that was tested?

A glucose
B glycoprotein
C glycolipid
D starch

Your answer [ ] [1]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Guidance
1			C	1	
			Total	**1**	
2			A	1	
			Total	**1**	
3			B	1	
			Total	**1**	
4			A	1	
			Total	**1**	
5			C	1	
			Total	**1**	
6			C	1	**Examiner's Comments** This question was straightforward recall and the majority of candidates chose the correct response.
			Total	**1**	
7			A	1	**Examiner's Comments** Candidates with a good understanding of the formation of a disaccharide by a condensation reaction could identify the correct formula for lactose. Some candidates simply added together the formulae of the two monosaccharides without removing the molecule of water from the total thereby giving option **B** as an incorrect response.
			Total	**1**	

Question			Answer/Indicative content	Marks	Guidance
8			D	1	**Examiner's Comments** This biochemistry-based question proved challenging. Candidates were required to use their knowledge of pentose and hexose structures to choose the correct diagram for a given molecular formula. The only pentose i.e. C5 monosaccharides were found in options **C** and **D.** Counting the atoms within the molecules would have given candidates the only possible option for the ratio of hydrogen to oxygen as option **D**.
			Total	**1**	
9			B	1	Examiner's Comments Many candidates chose the correct option **A** for this question. Prefixes such as ***inter***-, ***extra***- and ***intra***- are used throughout Biology and candidates should be familiar with their meaning.
			Total	**1**	
10			C	1	
			Total	**1**	
11			D ✓	1	
			Total	**1**	
12			B ✓	1	**Examiner's Comments** This was a straightforward question interpreting knowledge of biochemical tests and the majority of candidates chose the correct response.
			Total	**1**	