2.2 Carbohydrates & Lipids

Question Paper

Course	CIE A Level Biology (9700) exams from 2022
Section	2. Biological Molecules
Topic	2.2 Carbohydrates & Lipids
Difficulty	Medium

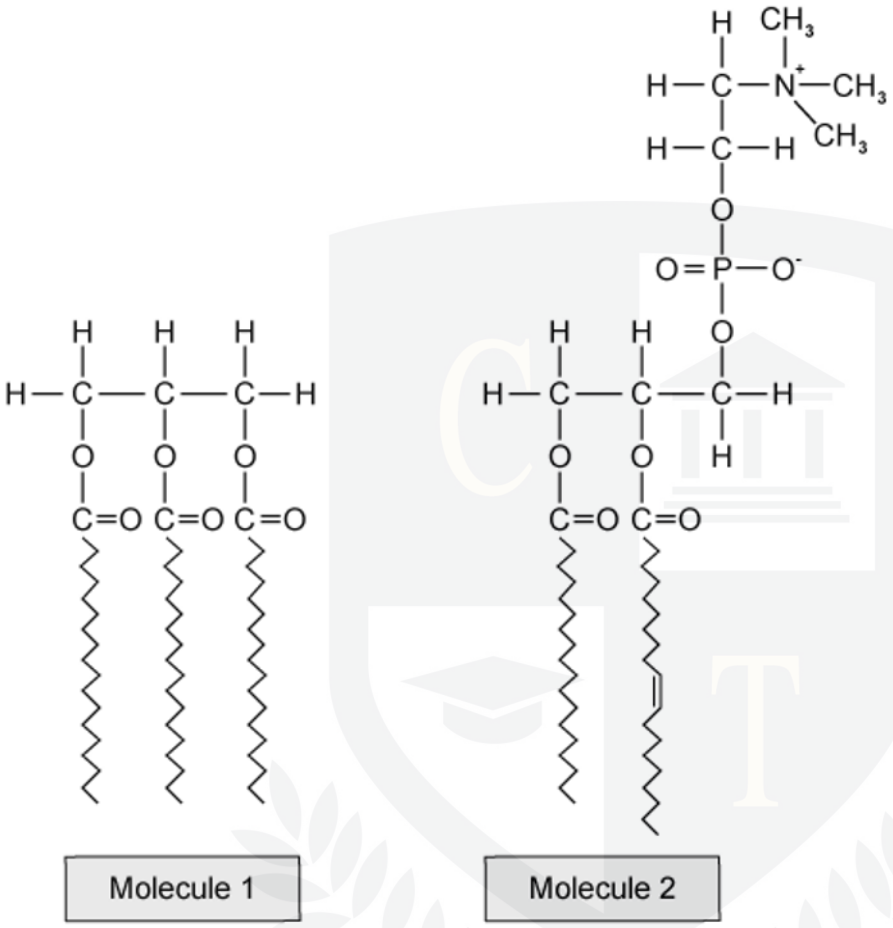
Time allowed: **10**

Score: **/10**

Percentage: **/100**

Question 1

Two biological molecules are shown in the diagram below.



Which row of the following table correctly identifies features of these molecules?

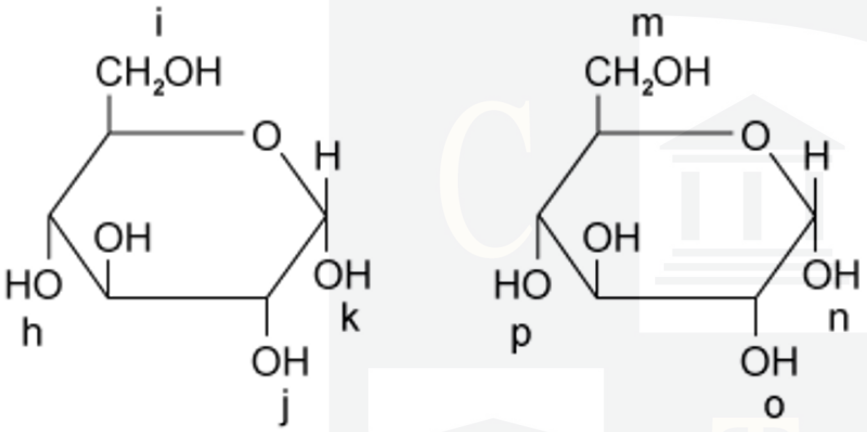
	Molecule 1	Molecule 2
A	has 3 fatty acid chains	fatty acid chains are all saturated
B	has 2 ester bonds and a phosphate group	has 3 phosphodiester bonds
C	has 3 saturated fatty acid chains	has 1 unsaturated fatty acid chain
D	molecule is polar	molecule is polar

[1 mark]

Question 2

Two molecules of glucose are shown in the diagram below.

Four possible bonding positions are labelled h, i, k and l, and m, n, o and p.



When these two molecules condense to form amylopectin, where could these bonds form?

A o – i or k – p

B p – i or p - k

C i – n or m - h

D p – k or n - i

[1 mark]

Question 3

Which of the following occurs when sucrose is formed from monosaccharides?

A Condensation of non-reducing sugars, using water

B Condensation of reducing sugars, using water

C Condensation of reducing sugars, releasing water

D Condensation of non-reducing sugars, releasing water

[1 mark]

Question 4

The molecular structure of starch makes it suited to its function.

Which of the following statements best explains why?

A Many condensation reactions, in the breakdown of amylose and amylopectin, release stored energy.

B Many hydrolysis reactions, in the formation of amylose and amylopectin, allow the release of stored energy to fuel cellular processes.

C Amylose has a branched structure and amylopectin is coiled to give a compact structure for transport around the plant through the phloem.

D The amylose-amylopectin complex is insoluble, so it does not affect the water potential of the cell.

[1 mark]

Question 5

There is a naturally occurring polysaccharide which has the structure of an unbranched chain of the molecule acetylglucosamine held together by β-1, 4 glycosidic bonds. Between these unbranched chains are many types of a much weaker bond.

There are $-CH_2OH$ groups that alternate on each side of the polysaccharide chain.

Which of the following polysaccharides has a structure similar to that described above?

A glycogen

B cellulose

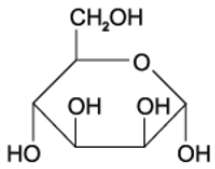
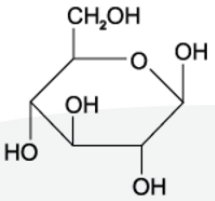
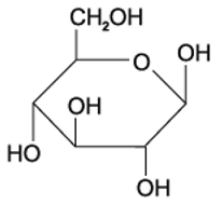
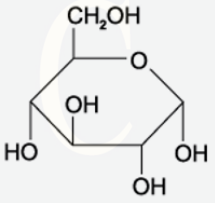
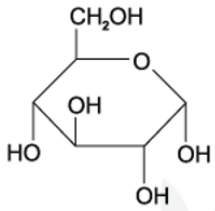
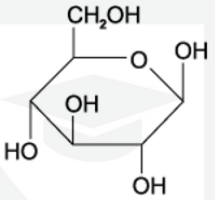
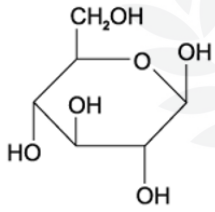
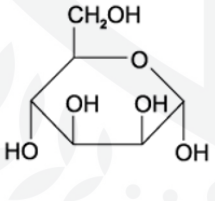
C amylopectin

D amylose

[1 mark]

Question 6

Which of the following correctly shows the structure of α-glucose and of β-glucose?

	β-glucose	α-glucose
A		
B		
C		
D		

[1 mark]

Question 7

Which of the following statements correctly describes a feature of carbohydrates or lipids?

A Glycosidic bonds form during hydrolysis reactions, joining monosaccharides together to form disaccharides and polysaccharides.

B A triglyceride is not an example of a polymer as it is not formed from smaller subunits joined together by covalent bonds.

C A triglyceride is not an example of a polymer although it is formed from smaller subunits joined together.

D Glycosidic bonds join disaccharides together to form monosaccharides and polysaccharides.

[1 mark]

Question 8

Which of the following procedures could be carried out on sucrose to achieve a positive test result for a reducing sugar?

1 Dissolve in water, neutralize with acid and then heat with Benedict's reagent.

2 Boil with hydrochloric acid, neutralise and then heat with Benedict's reagent.

3 Add hydrolytic enzymes and then heat with Benedict's reagent.

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

[1 mark]

Question 9

Which of the statements below correctly describes a disaccharide?

A Sugars formed from two subunits joined together by a covalent bond that forms during a hydrolysis reaction.

B Sugars formed from two subunits joined together by a glycosidic bond that forms during a hydrolysis reaction.

C Sugars formed from two subunits joined together by a glycosidic bond that forms during a condensation reaction.

D Starches formed from two subunits joined together by a covalent bond that forms during a condensation reaction.

[1 mark]

Question 10

All biological molecules have structures that relate to their functions.

Three statements about structure are given below:

1 It is insoluble in water.

2 Forms long straight chains of sugar subunits held together by glycosidic bonds.

3 Many hydrogen bonds are able to form.

Which of the options below would all three statements above apply to?

A amylose and amylopectin

B cellulose only

C both amylose and cellulose

D amylose only

[1 mark]