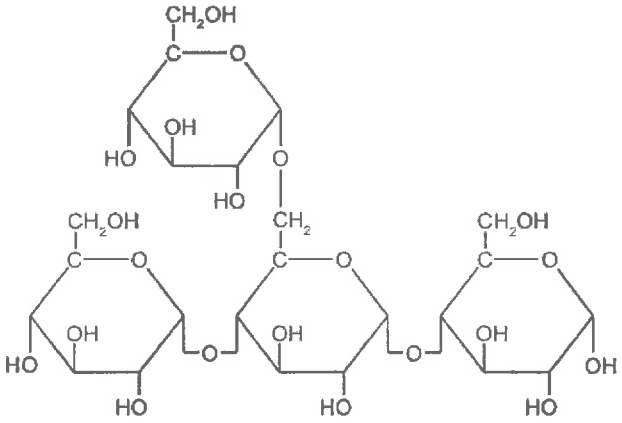
AS Biology
Carbohydrates & Lipids Practice
Objectives: 2.2a, b, c, d, e, f, g (syllabus p. 19)

Carbohydrates

1. ____ The diagram shows part of a carbohydrate molecule.

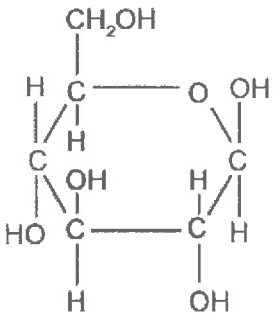


If all the 1,4 glycosidic bonds in this molecule are hydrolysed, how many water molecules will be used and how many separate glucose molecules will be produced?

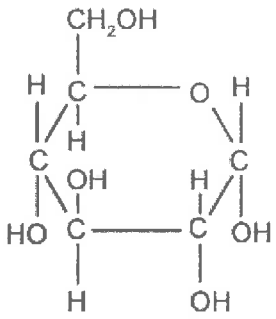
	number of water molecules used	number of glucose molecules produced
A	1	1
B	2	2
C	3	3
D	4	4

2. ____ Which shows α-glucose?

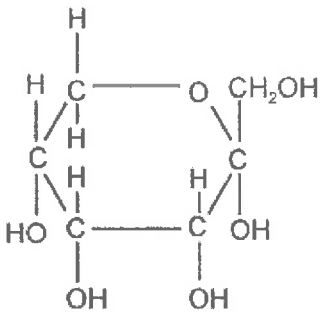
A



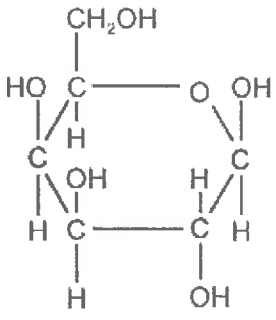
B



C

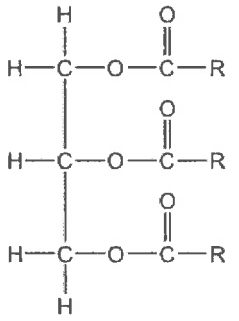


D

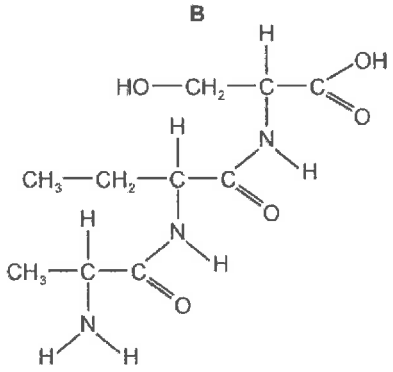


3. ____ Which molecule contains a glycosidic bond?

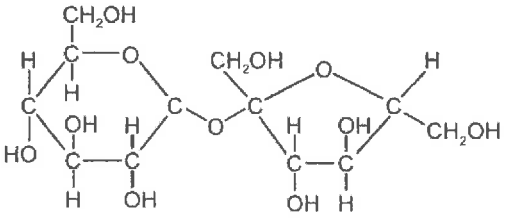
A



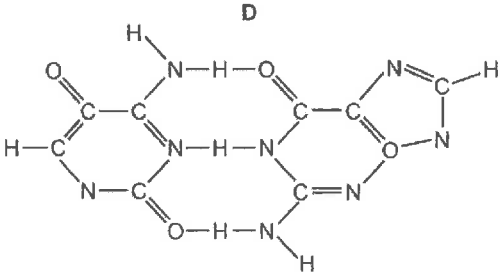
B



C

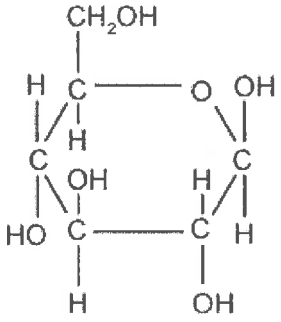


D



4. ____ Which shows the basic unit of glycogen?

A



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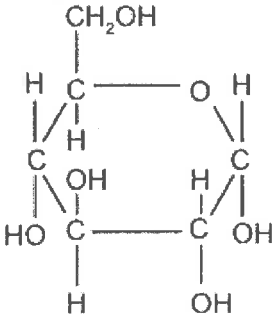

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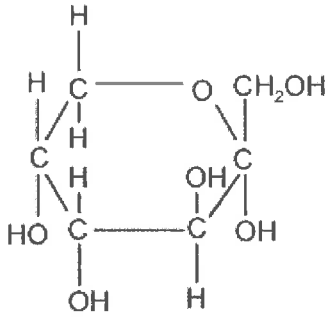

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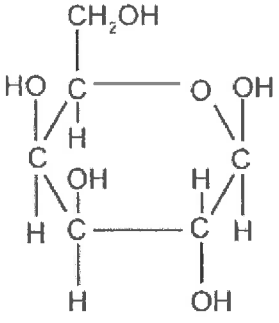


5. ___ Which feature distinguishes starch from glycogen?

A Starch contains α-glucose.

B Starch contains 1,6 glycosidic bonds.

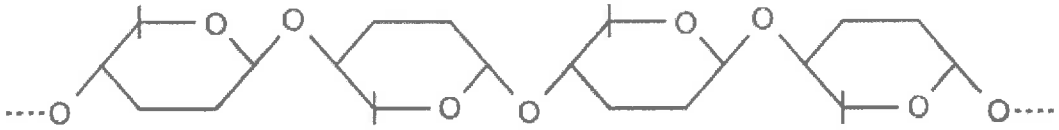
C Starch has an unbranched component.

D Starch is a polysaccharide.

6. ___ Which diagram shows part of a structural polysaccharide?

A

B



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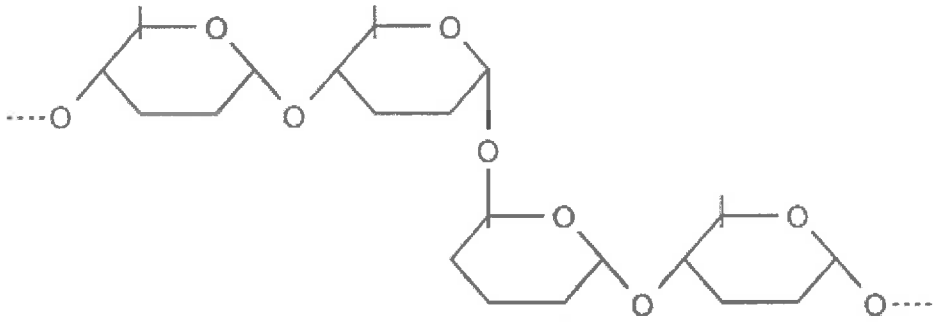
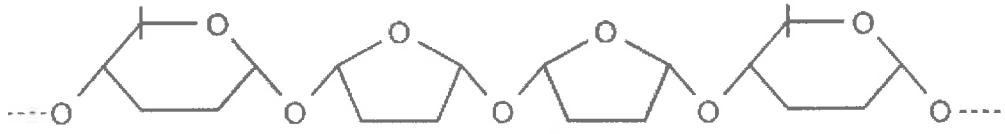


D



7. ____ Which features adapt a cellulose molecule for its function?

1 Long chains of glucose molecules coil into a helix.

2 Many hydrogen bonds form between adjacent chains.

3 It is insoluble in water.

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

8. ____ Which bonds will be broken when a molecule of amylose is hydrolysed?

1 α1,4

2 β1,4

3 α1,6

4 β1,6

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

9. ____ Which statements about amylopectin and glycogen are correct?

1 both contain 1-4 glycosidic bonds

2 amylopectin contains β-glucose

3 glycogen contains more 1-6 branches than amylopectin

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

10. ____ Which linkages are found between the glucose units in cellulose?

A α 1–4 only

B α 1–4 and α 1–6

C β 1–4 and α 1–6

D β 1–4 only

(b) Glycogen and cellulose are two other polysaccharides.

Complete Table 3.1 to compare glycogen and cellulose with amylose.

Table 3.1

feature	amylose	glycogen	cellulose
monomer	α-glucose		
branched or unbranched molecule	unbranched		
role in organisms	energy storage		

[3]

(b) Cellulose has high mechanical strength which makes it suitable for the cell walls of plants.

Explain how cellulose has such a high mechanical strength making it suitable for the cell walls of plants.

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.....[2]

Lipids

12. ___ Some foods contain 'hydrogenated vegetable oils'. These are unsaturated fats that have been converted to saturated fats.

Which property of the fats will have changed?

A Their hydrocarbon chains will fit together more closely.

B Their solubility in water will increase.

C They will have more double bonds in their molecules.

D They will remain liquid at room temperature.

13. ___ The structure of phospholipids and triglycerides include the following.

1 glycerol linked to fatty acids

2 hydrophobic fatty acid chains

3 saturated fatty acid chains

Which structures enable the formation of a lipid bilayer in cell surface membranes?

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

14. ___ Which describes the emulsion test for the presence of lipids?

A Add ethanol and shake.

B Add ethanol, pour into water and shake.

C Add water and shake.

D Add water, pour into ethanol and shake.

15. Fig. 5.1 shows a diagram of the molecular structures of tristearin (a triglyceride) and phosphatidylcholine (a phospholipid).

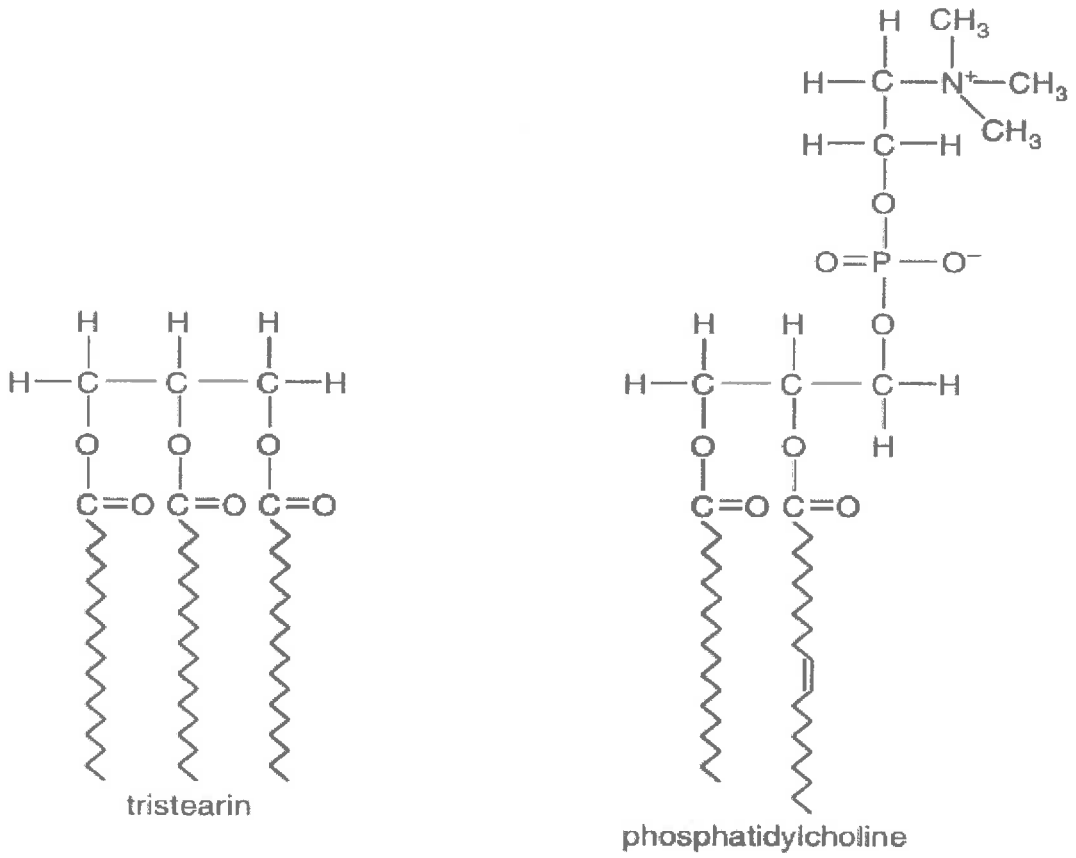

Fig. 5.1

(a) Table 5.1 shows a structural difference between the two molecules shown in Fig. 5.1.

Complete Table 5.1 with two further structural differences **other than** in numbers of different types of atoms.

Table 5.1

structural feature	tristearin	phosphatidylcholine
length of fatty acid chains	all the same length	different lengths

[2]