Q1.

(a) What is a monomer?

_____

_____

_____

_____

_____

(1)

(b) Lactulose is a disaccharide formed from one molecule of galactose and one molecule of fructose.

Other than both being disaccharides, give one similarity and one difference between the structures of lactulose and lactose.

Similarity _____

_____

_____

_____

_____

Difference _____

_____

_____

_____

_____

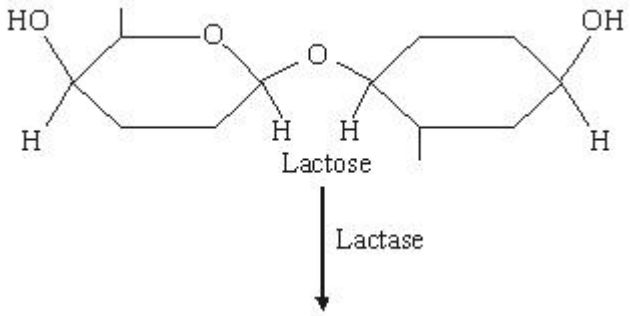
(2)

(Total 3 marks)

Q2.

Lactose is a disaccharide found in milk. In the human small intestine, the enzyme lactase catalyses the hydrolysis of lactose to the monosaccharides, galactose and glucose. These monosaccharides are then absorbed into the blood.

(a) Complete the diagram to show the hydrolysis of lactose to galactose and glucose.



(2)

(b) Name the monosaccharides of which the following disaccharides are composed.

(i) Sucrose

monosaccharides_____and_____

(1)

(ii) Lactose

monosaccharides_____and_____

(1)

(c) Two glucose molecules join together to form a disaccharide.

(i) Name the products of this reaction.

_____

(2)

(ii) Name the type of reaction that joins the glucose molecules together.

_____

(1)

(Total 7 marks)

Q3.

Lactose is a disaccharide sugar which can be broken down by the enzyme lactase into two monosaccharides, glucose and galactose.

$$\text{lactose + water} \xrightarrow{\text{lactase}} \text{glucose + galactose}$$

(a) The formula for galactose is $C_6H_{12}O_6$. What is the formula for lactose?

_____

(2)

(b) A solution containing the enzyme lactase was added to a lactose solution. The solution was incubated at 40 °C for one hour. Sample **A** was removed from the tube before incubation. Sample **B** was removed after one hour.

(i) Describe a chemical test you could carry out on sample **A** to show that lactose is a reducing sugar.

_____

_____

_____

_____

(2)

(ii) This chemical test was carried out on samples **A** and **B**. All experimental variables were the same in the testing of the two samples. Both tubes were left for ten minutes to allow the precipitate to settle. The diagram shows the result.

Is galactose a reducing sugar? _____

Explain how the results in the diagram support your answer.

_____

_____

_____

_____

(2)

(Total 6 marks)

Q4.

(a) The table shows some statements about three carbohydrates. Complete the table with a tick in each box if the statement is true.

Statement	Starch	Cellulose	Glycogen
Found in plant cells			
Contains glycosidic bonds			
Contains β-glucose			

(3)

(b) Name the type of reaction that would break down these carbohydrates into their monomers.

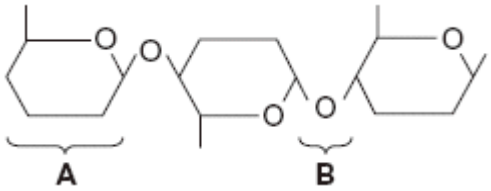
_____

(1)

(Total 4 marks)

Q5.

(a) The diagram shows part of a cellulose molecule.



(i) Name part **A**.

_____

(1)

(ii) Name bond **B**.

_____

(1)

(b) The structure of cellulose is related to its role in plant cell walls. Explain how.

_____

_____

_____

_____

_____

(3)

(Total 5 marks)

Q6.

(a) Glycogen and cellulose are both carbohydrates.
Describe **two** differences between the structure of a cellulose molecule and a glycogen molecule.

1. _____

_____

_____

2. _____

_____

_____

(2)

(b) Starch is a carbohydrate often stored in plant cells.
Describe and explain **two** features of starch that make it a good storage molecule.

1. _____

_____

_____

2. _____

_____

_____

(2)

(c) Tick (✓) the box that identifies the test which would be used to show the presence of starch.

Acid hydrolysis test	☐
Benedict's test	☐
Emulsion test	☐
Iodine/potassium iodide test	☐

(1)

(Total 5 marks)

Q7.

(a) Describe the structure of a cellulose molecule and explain how cellulose is adapted for its function in cells.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

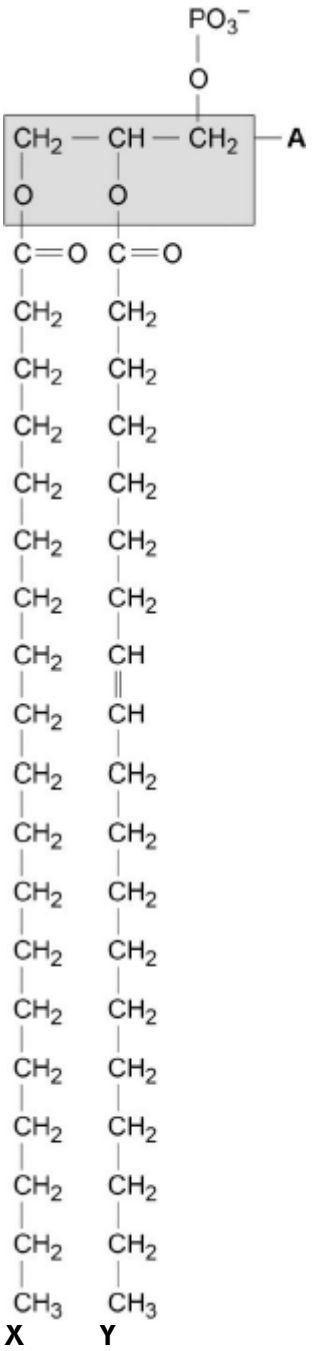
_____

_____

(6)
(Total 6 marks)

Q8.

The figure below shows a phospholipid.



(a) The part of the phospholipid labelled **A** is formed from a particular molecule. Name this molecule.

_____

(1)

(b) Name the type of bond between **A** and fatty acid **X**.

_____

(1)

(c) Which of the fatty acids, **X** or **Y**, in the figure above is unsaturated? Explain your answer.

_____

_____

_____

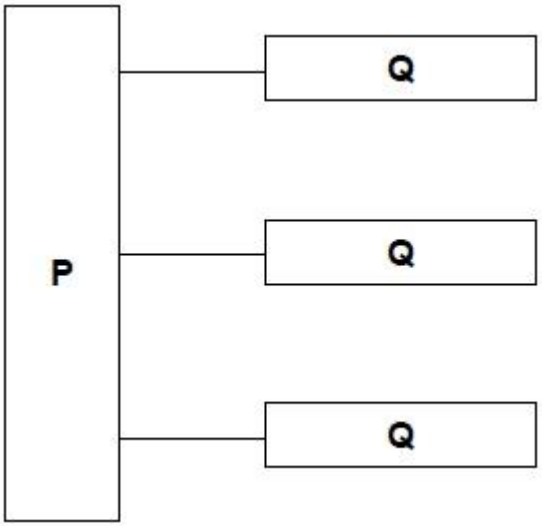
_____

(1)

(Total 3 marks)

Q9.

The diagram represents a triglyceride.



(a) Name the molecules represented in the diagram by:

Box **P** _____

Box **Q** _____

(2)

(b) Name the type of bond between **P** and **Q** in the diagram.

_____

(1)

(Total 3 marks)

Q10.

(a) Some seeds contain lipids. Describe how you could use the emulsion test to show that a seed contains lipids.

_____

_____

_____

_____

_____

_____

_____

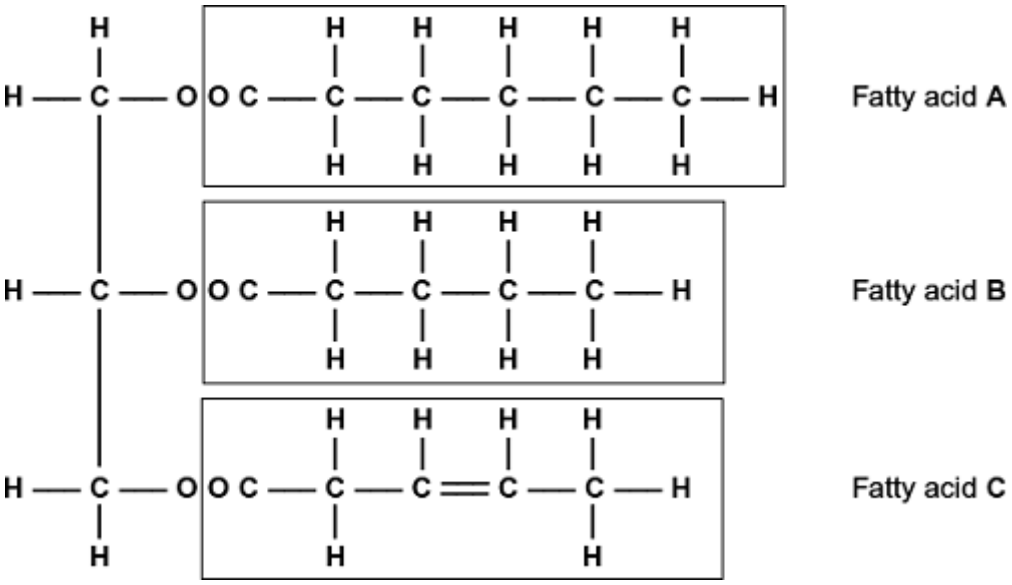
(*Extra space*)_____

_____

_____

(3)

(b) A triglyceride is one type of lipid. The diagram shows the structure of a triglyceride molecule.



(i) A triglyceride molecule is formed by condensation. From how many molecules is this triglyceride formed?

(1)

(ii) The structure of a phospholipid molecule is different from that of a triglyceride. Describe how a phospholipid is different.

_____

_____

_____

_____

_____

(2)

(iii) Use the diagram to explain what is meant by an unsaturated fatty acid.

_____

_____

_____

_____

_____

(2)
(Total 8 marks)