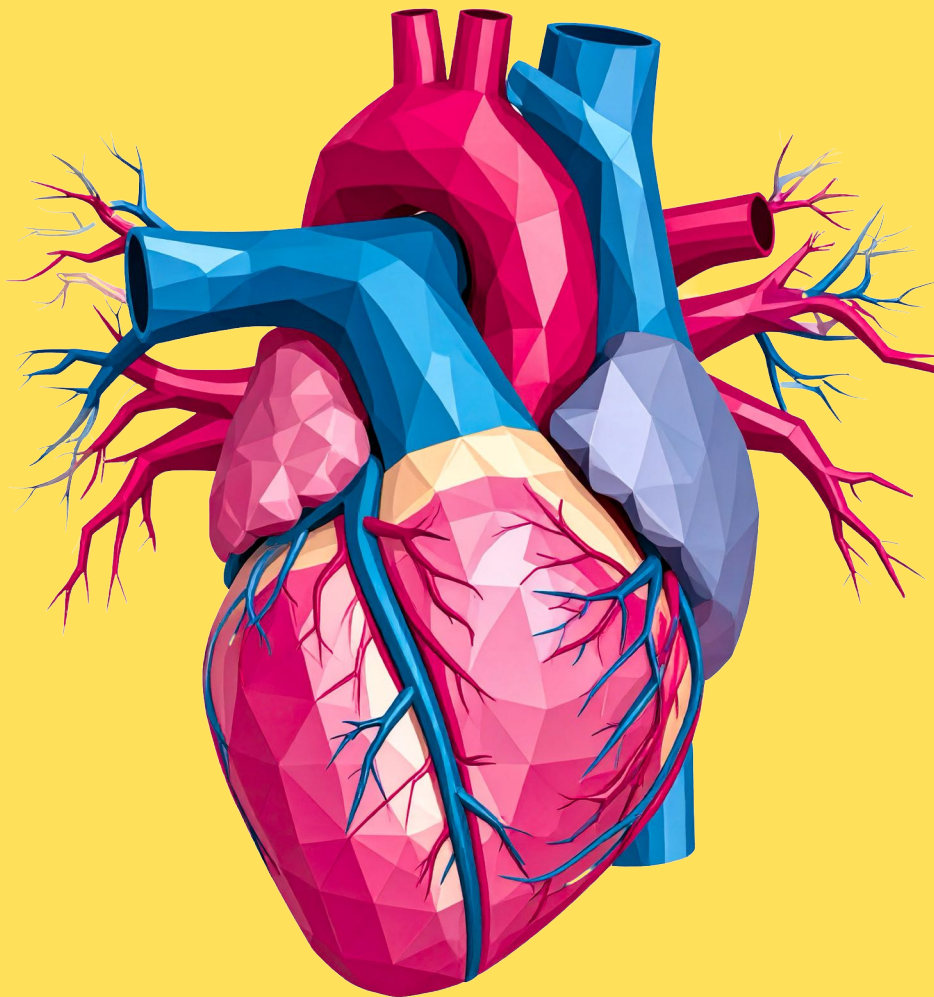


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AS

Biology



Unit 1

Practice Questions



WATER & CARBOHYDRATES

- 1** Read through the following account of the properties of water, then write on the dotted lines the most appropriate word or words to complete the account.

Water has the chemical formula Water molecules are described as because they have a slight positive charge at one end of the molecule and a slight negative charge at the other end. As a result, individual molecules form bonds with each other.

Water is an important in living organisms because most biochemical reactions take place in aqueous solution. Water also has a high, which means that its temperature remains relatively stable despite large changes in the temperature of the surrounding environment.

Total 5 marks

- 2** Read through the following account about water, then write on the dotted lines the most appropriate word or words to complete the account.

Water molecules are described as because they have a slight positive charge at one end of the molecule and a slight negative charge at the other end. This makes water a good for salts and substances such as sugars.

Bonds that form between water molecules are called bonds.

Water is a good coolant because it has a high, which means that it takes a lot of heat to change it from a liquid to a gas. Water also has a high, which means that a lot of energy is needed to cause a small rise in its temperature.

Total 5 marks



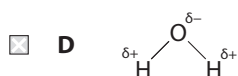
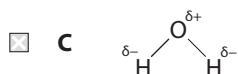
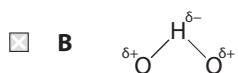
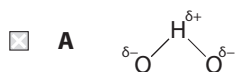
WATER & CARBOHYDRATES

3 Water is an important solvent in biological systems.

(a) Put a cross ☒ in the box that completes each of the following statements.

(i) The drawing that represents a molecule of water is

(1)



(ii) The intermolecular force that explains many of the important properties of water is

(1)

- ☐ **A** covalent bonding
- ☒ **B** hydrogen bonding
- ☐ **C** ionic bonding
- ☐ **D** oxygen bonding



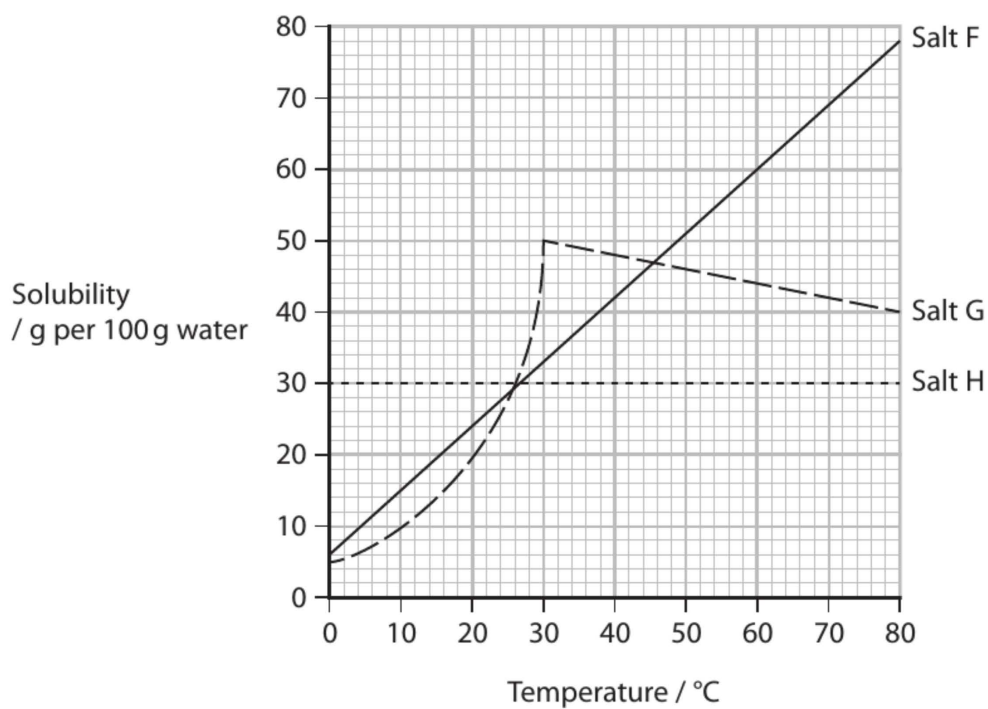
WATER & CARBOHYDRATES

4 Water is important as a solvent for transport in living organisms.

(a) Draw a diagram of a water molecule to show its dipole nature.

(2)

(b) The graph shows the effect of temperature on the solubility in water of three salts, F, G and H, in the human diet.





WATER & CARBOHYDRATES

(i) Describe the effect of temperature on the solubility of these three salts.

(3)

(ii) How many times more soluble is salt G than salt H at 30 °C?

(1)

- ☐ **A** 15.00
- ☐ **B** 1.67
- ☐ **C** 1.50
- ☐ **D** 0.60

(Total for Question 1 = 6 marks)



WATER & CARBOHYDRATES

5 Carbohydrates are one of the main types of nutrient. They include polysaccharides, disaccharides and monosaccharides.

(a) (i) Which formula is correct for a monosaccharide?

(1)



(ii) Name the reaction that joins two monosaccharides together to form a disaccharide.

(1)

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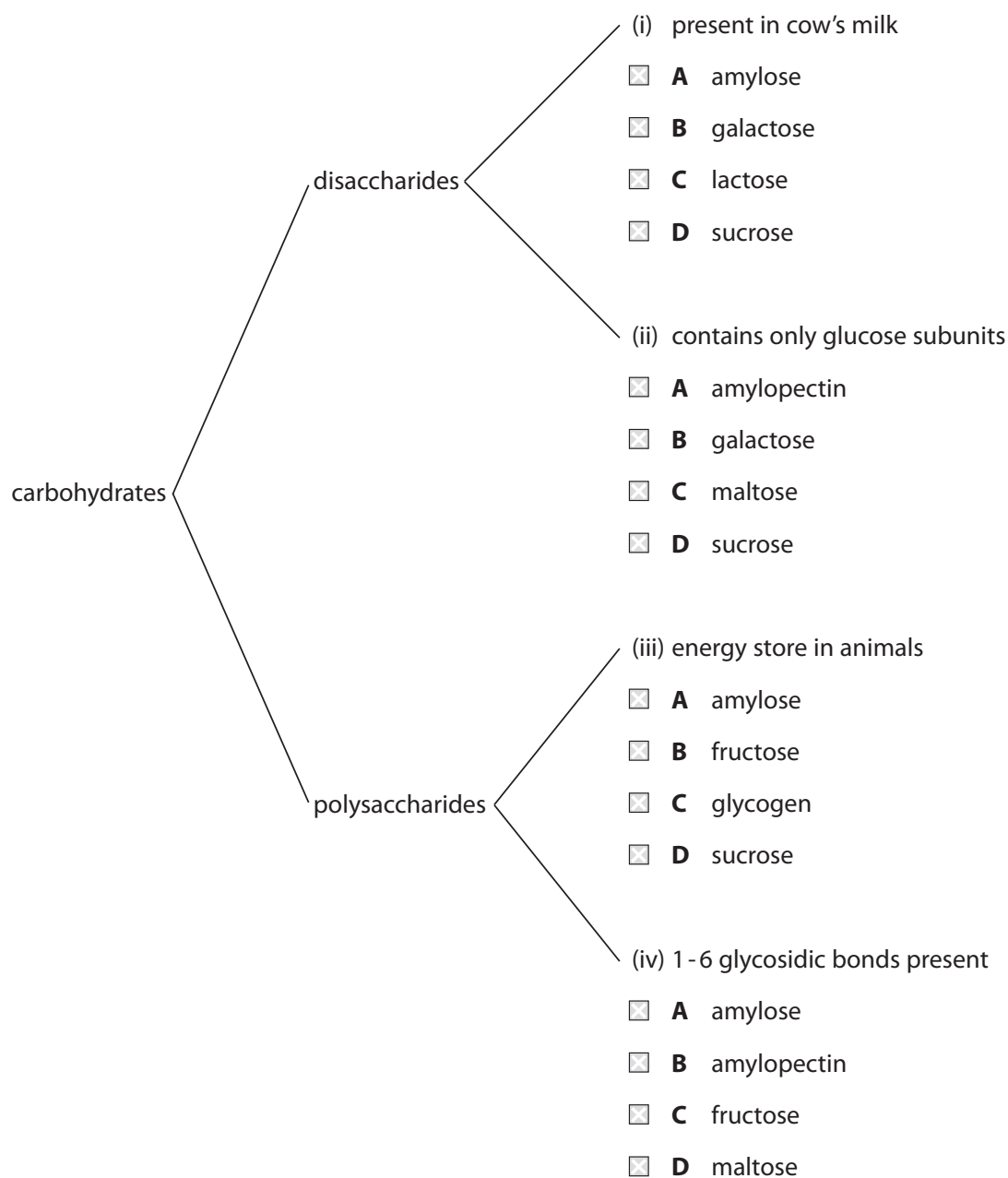


WATER & CARBOHYDRATES

(b) The diagram shows some information about carbohydrates.

Which carbohydrate is being described in each of (i) to (iv)?

(4)

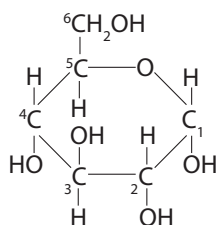


(Total for Question 1 = 6 marks)

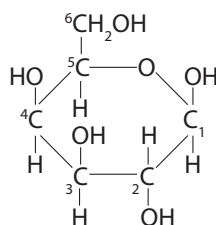


WATER & CARBOHYDRATES

- 6** The diagrams below show the structure of two carbohydrate molecules, α -glucose and galactose.



α -glucose



galactose

- (a) Use the information in the diagrams to explain why these two molecules are classed as monosaccharides.

(2)

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- (b) Use the information in the diagrams to give **two** differences between a molecule of α -glucose and a molecule of galactose.

(2)

1

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2

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WATER & CARBOHYDRATES

- (c) (i) Place a cross ☐ in the box next to the carbohydrate that is formed when a molecule of α -glucose and a molecule of galactose join together.

(1)

- ☐ **A** amylose
☐ **B** lactose
☐ **C** maltose
☐ **D** sucrose

- (ii) Describe how these two monosaccharides join to form this carbohydrate.

(3)

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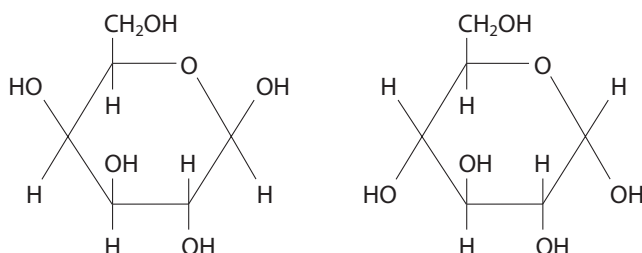


WATER & CARBOHYDRATES

7 Galactosaemia is a genetic disorder that affects an individual's ability to metabolise the monosaccharide galactose.

Dairy products contain the disaccharide lactose, which is broken down into galactose and glucose during digestion. If the galactose is not broken down further this may result in damage to the brain, kidneys or liver.

(a) The diagram below shows the structure of a galactose molecule and a glucose molecule.



(i) In the space below, draw a diagram to show the products formed when these two molecules join together to form lactose.

(3)

(ii) Name the chemical reaction that joins the galactose and glucose molecules together.

(1)

(iii) Name the bond that joins the galactose and glucose molecules together.

(1)



WATER & CARBOHYDRATES

8 The addition of sugars to food is one risk factor for cardiovascular disease (CVD).

(a) Two sources of sugar used in foods are sucrose and high-fructose corn syrup.

(i) Describe how sucrose is formed from monosaccharides.

(3)

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(ii) High-fructose corn syrup is manufactured from starch.

Describe the structure of starch.

(3)

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WATER & CARBOHYDRATES

(b) Glycogen is a source of energy for muscle cells during exercise.

(i) Name the bond between glucose molecules in glycogen.

(1)

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(ii) Name the type of reaction that takes place when glycogen is broken down into glucose.

(1)

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(iii) Explain why glycogen is a good energy storage molecule in muscle cells.

(3)

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WATER & CARBOHYDRATES

9 All living organisms rely on a variety of biological molecules.

Carbohydrates and lipids are biological molecules.

(a) (i) Below is a list of carbohydrates.

- glucose
- lactose
- maltose
- sucrose

Put a cross ☒ in the box next to the number of these carbohydrates that are disaccharides.

(1)

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

(ii) Starch is a carbohydrate that breaks down into glucose.

Put a cross ☒ in the box to complete the following statement.

The type of reaction that breaks down starch into glucose is

(1)

- ☐ **A** condensation
- ☐ **B** esterification
- ☐ **C** hydrolysis
- ☐ **D** synthesis



WATER & CARBOHYDRATES

(c) Starch is a storage carbohydrate in plants.

Barley grains contain a high proportion of starch.

The photograph below shows barley plants.



Magnification $\times 1$

Explain how the structure of starch makes it suitable for the storage of energy.

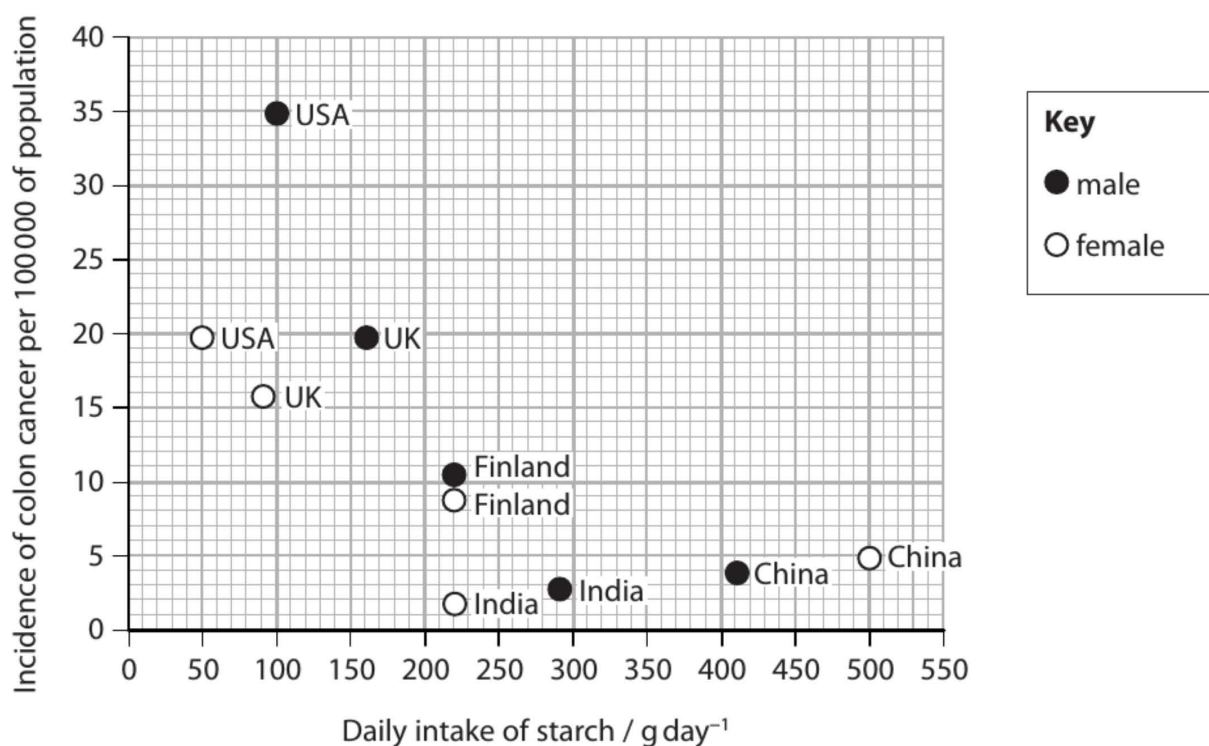
(3)



WATER & CARBOHYDRATES

- (d) Scientists have studied the relationship between daily intake of starch and the incidence of colon cancer in humans in five countries.

The graph below shows the results of this study.



- (i) State the relationship between the daily intake of starch and the incidence of colon cancer.

(1)

- (ii) Suggest **one** reason for the difference in the daily intake of starch between men and women.

(1)



WATER & CARBOHYDRATES

- (iii) Using the information in the graph, discuss whether males have a higher risk than women of developing colon cancer.

(3)

(Total for Question 1 = 12 marks)



WATER & CARBOHYDRATES

- (c) The table below shows the effect of the intensity of exercise on the percentage of energy obtained from lipids and carbohydrates.

Intensity of exercise / arbitrary units	Percentage of energy obtained (%)	
	From lipids	From carbohydrates
20	60	40
40	50	50
60	30	70
80	20	80
100	0	100

Using the information in the table, describe the effect of the intensity of exercise on the percentage of energy obtained from lipids and carbohydrates.

(3)

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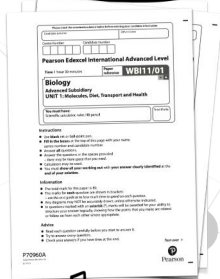
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(Total for Question 2 = 9 marks)

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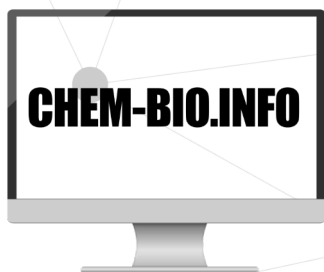
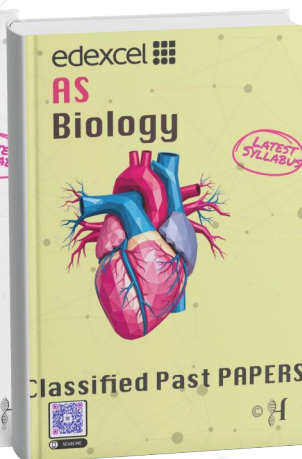
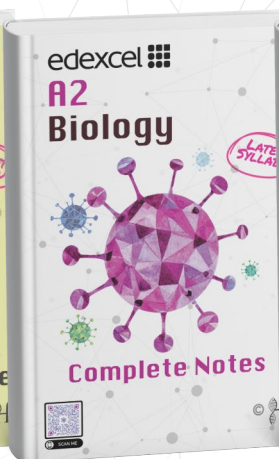
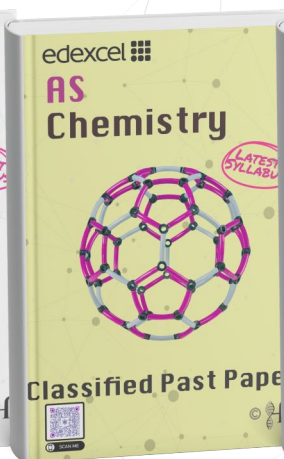
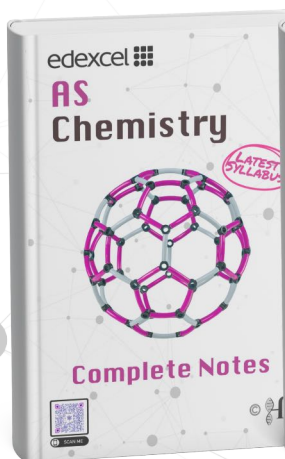


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