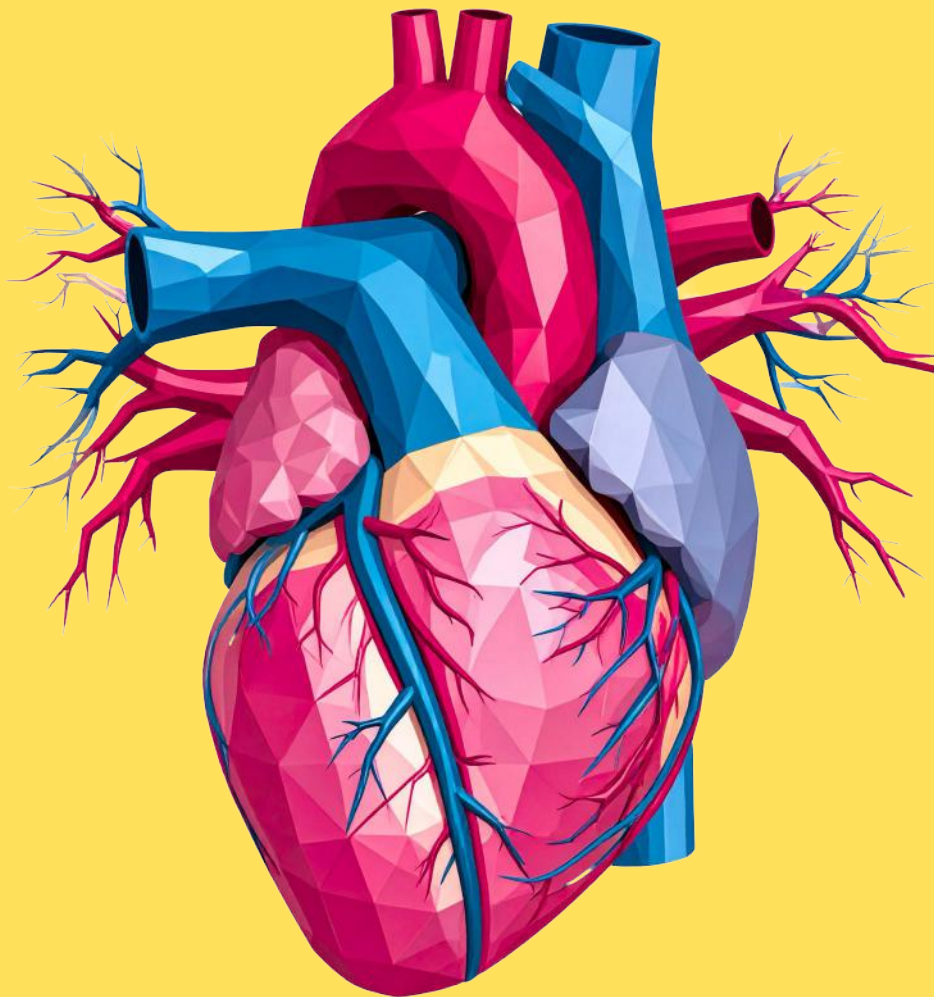


edexcel 

AS

Biology



Unit 1

Practice Questions

BIOLOGICAL MOLECULES I



- 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 **H₂O** Water molecules are described as **Dipole** 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 **Hydrogen** bonds with each other.

Water is an important **solvent** in living organisms because most biochemical reactions take place in aqueous solution. Water also has a high **specific heat capacity**, 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 **dipoles** 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 **solvent** for salts and substances such as sugars.

Bonds that form between water molecules are called **hydrogen** bonds.

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

(Total 5 marks)

BIOLOGICAL MOLECULES I



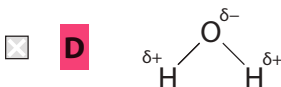
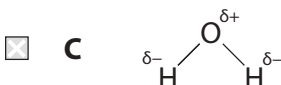
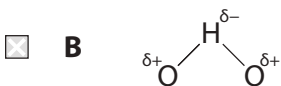
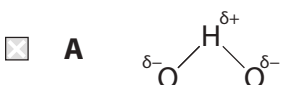
Some questions must be answered with a cross in a box ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

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

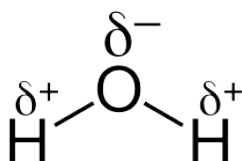
☐ **C** ionic bonding

☐ **D** oxygen bonding

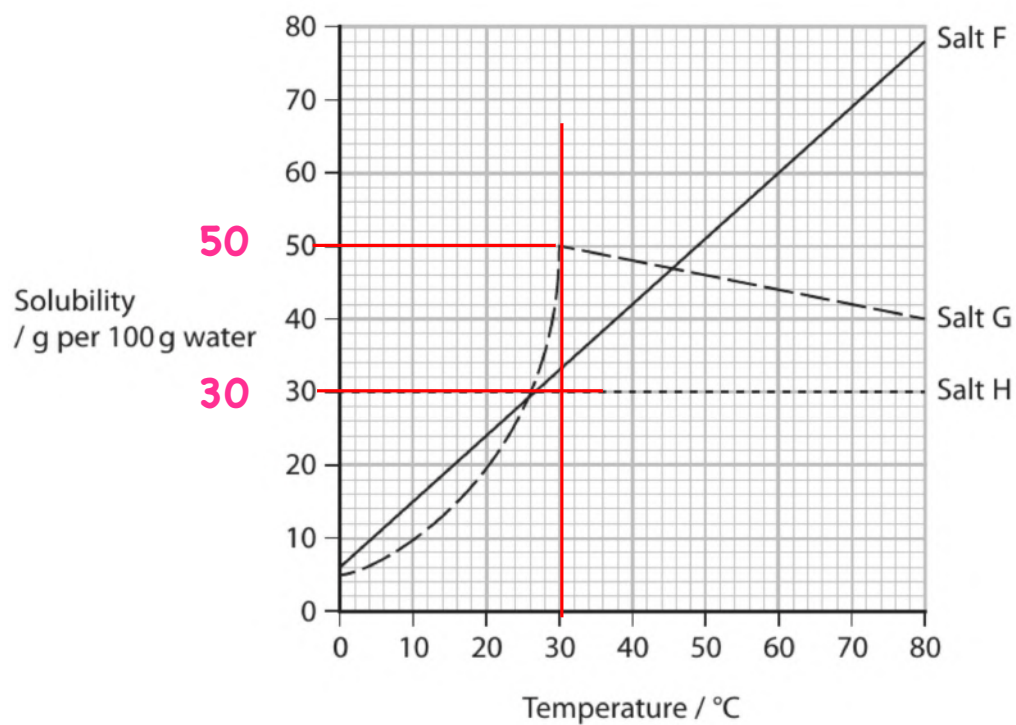
4 Water is important as a solvent for transport in living organisms.

(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.



BIOLOGICAL MOLECULES I



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

(3)

for F increase in temperature increases solubility

for G increase in temperature increases solubility up to 30 °C and then it decreases

for H temperature has no effect on solubility

(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

from the graph
 $50 \div 30$

(Total for Question 1 = 6 marks)

BIOLOGICAL MOLECULES I



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)

.....**Condensation**.....

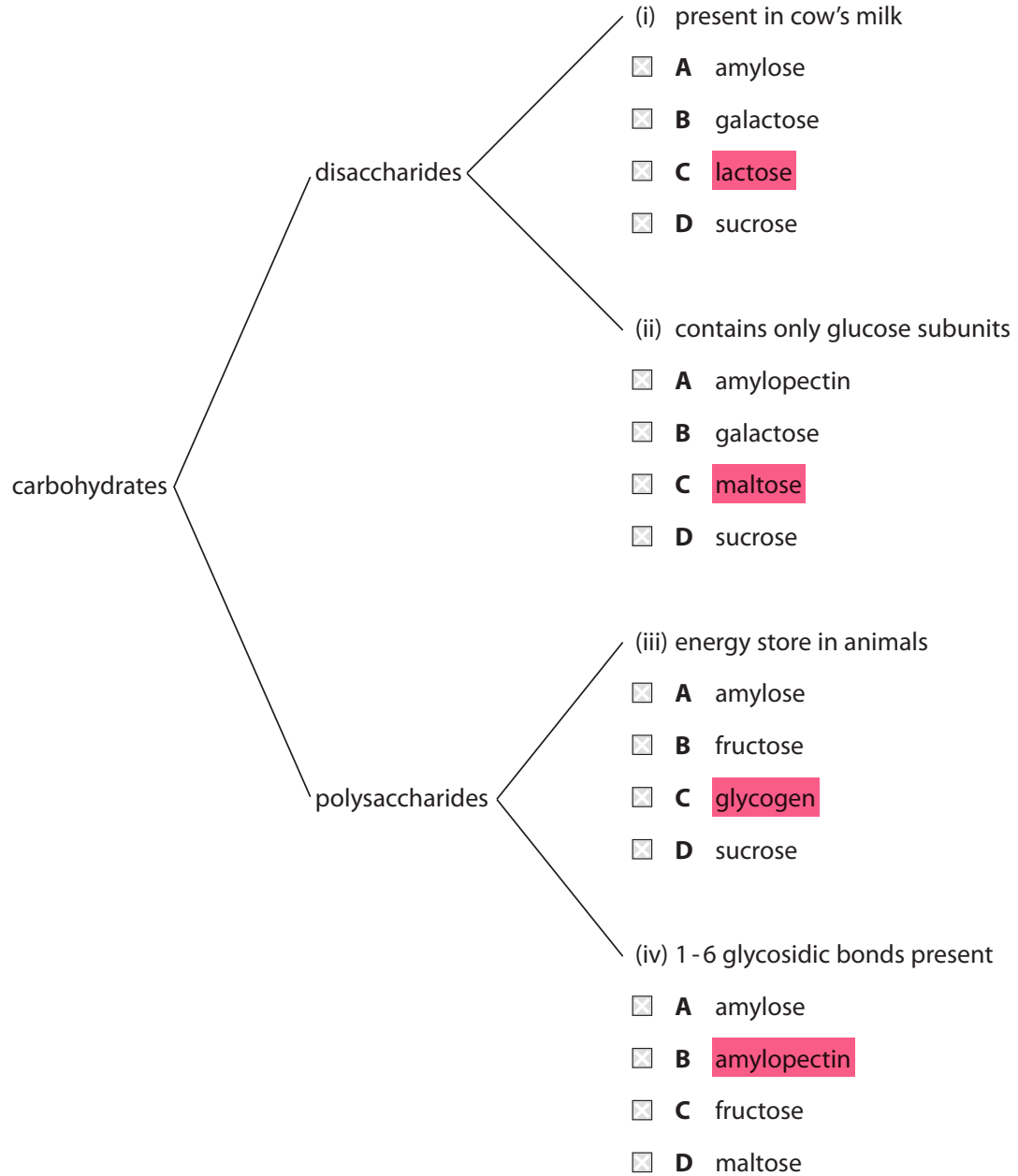
BIOLOGICAL MOLECULES I



(b) The diagram shows some information about carbohydrates.

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

(4)

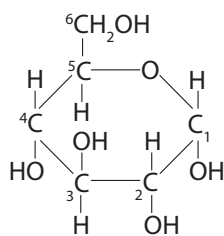


(Total for Question 1 = 6 marks)

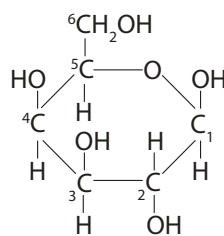
BIOLOGICAL MOLECULES I



- 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)

Both consist of carbon, hydrogen and oxygen

The ratio of C:H:O is 1:2:1

There are no glycosidic bonds (so not disaccharides)

/ Each is made of just one sugar unit

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

(2)

1 The position of OH carbon number 1 is reversed

2 The position of OH carbon number 4 is also reversed

BIOLOGICAL MOLECULES I



- (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)

By the formation of glycosidic bonds

between carbon number 1 and carbon number 4

This happens though a condensation reaction

A water molecule is lost during this reaction

.....

.....

.....

.....

.....

.....

.....

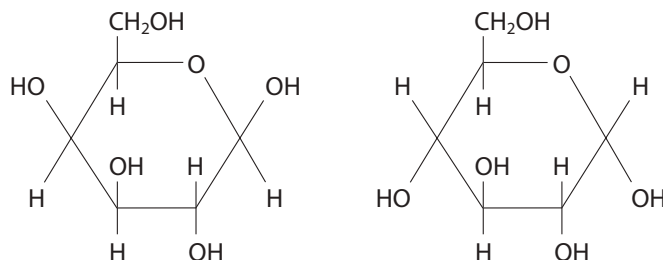
BIOLOGICAL MOLECULES I



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

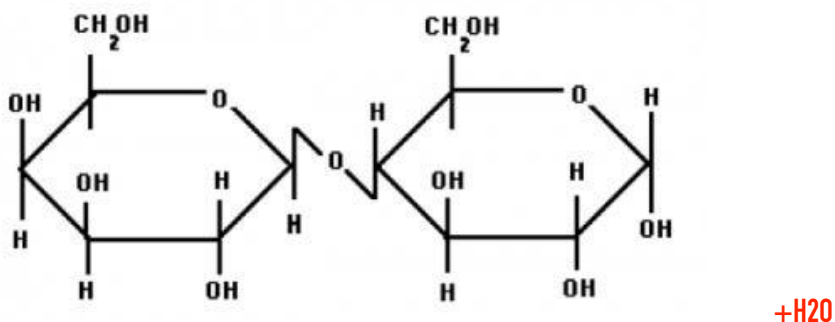
Dairy products contain the disaccharide lactose, which is broken down into galactose and glucose during digestion. If the galactose is not broken down further this may result in damage to the brain, kidneys or liver.

(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.

condensation

(1)

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

(1,4) glycosidic bond

(1)

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)

By the reaction of the monosaccharides glucose and fructose

Through a condensation reaction

to form a glycosidic bond

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

Describe the structure of starch.

(3)

In starch, many glucose molecules joined by glycosidic bonds

Starch is made of two parts: amylose and amylopectin

Amylose is linear (unbranched), it is also helical

Only 1,4 glycosidic bonds are available in amylose

Amylopectin is branched with both 1,4 and 1,6 glycosidic bonds

BIOLOGICAL MOLECULES I



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

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

(1)

glycosidic bond or glycosidic link

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

(1)

Hydrolysis

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

(3)

1. Glycogen is a branched polysaccharide
 2. that is makes glycogen hydrolysed rapidly
 3. Glycogen is a compact molecule
 4. to store large quantities of glucose in a small space in the cell
 5. Glycogen has low solubility
 6. so it does not difuse out of cells and does not have any osmotic effect
-

BIOLOGICAL MOLECULES I



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

BIOLOGICAL MOLECULES I



(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)

Starch is a glucose polymer that is compact

Therefore starch stores lots of energy in little volume inside the cell

Starch contains amylopectin which is a branched molecule

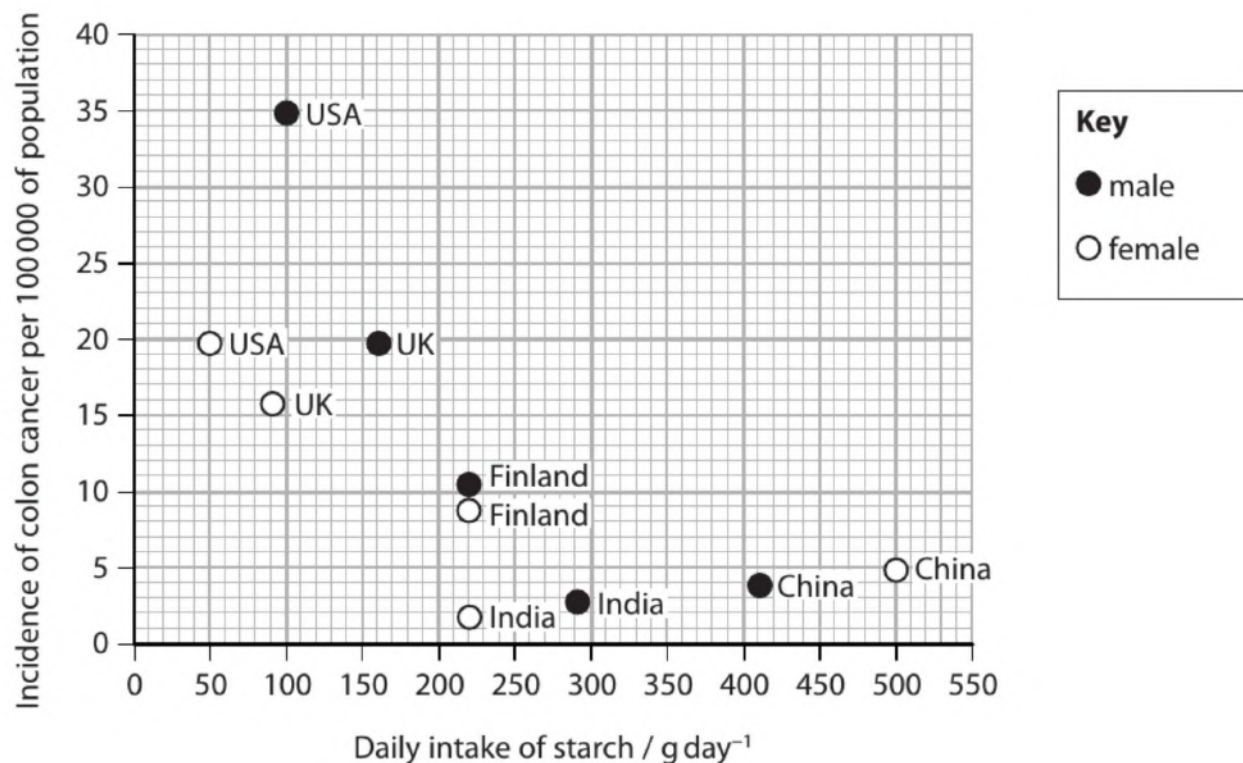
This makes it rapidly hydrolysed

BIOLOGICAL MOLECULES I



- (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)

As the daily intake of starch increases the incidence of colon cancer decreases

/ negative correlation

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

(1)

women have a lower daily energy intake/ requirement than men

BIOLOGICAL MOLECULES I



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

(3)

In general men have a higher risk than women

For example: the risk of men in USA is greater by 15 than women per 100 000 population

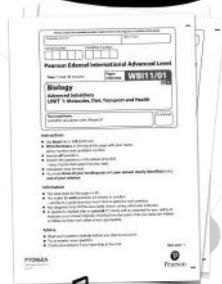
Except for china were women have higher risk

(Total for Question 1 = 12 marks)

The Complete Course for IAL AS Biology



Videos that cover the entire syllabus

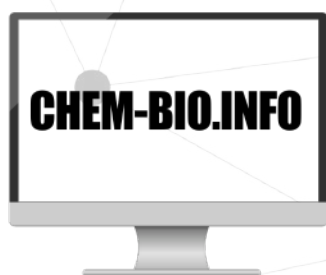
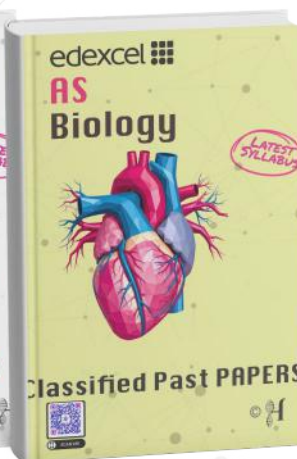
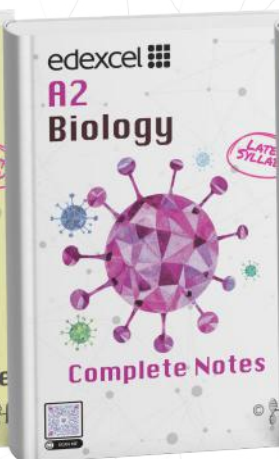
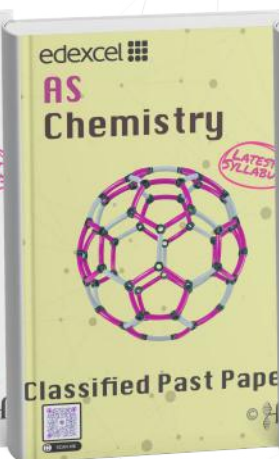
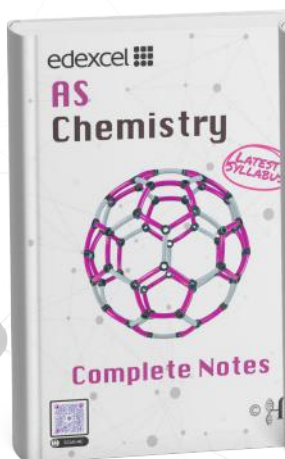


Exam-expert solved past papers



Test your knowledge on each topic.

JOIN NOW



WHATSAPP



51375709



50144115



chem_bio.info