

1)

(a) Fig. 1.1, on the insert, shows an electron micrograph of cells from the liver.

(i) Some cells, such as liver cells, contain a lot of Golgi apparatus.

State **one** function of the Golgi apparatus.

..... [1]

(ii) Suggest why the nuclear envelope contains pores.

..... [2]

(iii) State the function of the lysosomes.

..... [1]

(b) The liver is an organ.

Explain what is meant by the term *organ*.

..... [2]

2)

The cell surface membrane allows different substances to enter and leave the cell.

(a) List **three** components of a cell surface membrane.

..... [3]

(b) (i) Explain what is meant by the term *active transport*.

..... [2]

(ii) State **two** examples of active transport in cells.

For each example, you should name the substance that is transported **and** the cell involved.

..... [2]

(c) In addition to active transport, substances can pass through cell surface membranes by:

- diffusion
- facilitated diffusion
- osmosis
- bulk transport (endocytosis / exocytosis)

For each example described in Table 2.1 below, state how the substance crosses the cell surface membrane. The first one has been done for you.

**Table 2.1**

example	mechanism of movement across cell surface membrane
release of enzymes into the gut	bulk transport
a plant cell taking up water	
calcium ions entering a nerve cell down a concentration gradient	
oxygen entering a red blood cell	

[3]

[Total: 10]

3)

In plants, dividing cells can be found in meristematic tissue.

(a) Name two parts of a plant where meristematic tissue can be found.

..... [2]

(b) In an investigation, a student observed the cells in a stained section of meristematic tissue. The student counted how many cells could be seen in each stage of the cell cycle.

Table 4.1 shows the results.

**Table 4.1**

stage of cell cycle	percentage cells in stage (%)
interphase	82.00
prophase	4.34
metaphase	3.23
anaphase	3.23
telophase	7.20

(i) Explain why the meristematic tissue needed to be stained for this investigation.

..... [2]

(ii) Name the type of nuclear division that occurs in a plant meristem.

..... [1]

- (c) Using the results shown in Table 4.1, calculate the percentage of the cell cycle taken up by nuclear division.

Show your working.

Answer = ..... % [2]

- (d) State **one** way in which the products of **meiosis** are different from the products of nuclear division in meristematic tissue.

..... [1] [Total: 8]

4)

- (a) Translocation is the movement of assimilates along the phloem from one part of a plant to another.

- (i) Name the sugar molecule most commonly translocated.

..... [1]

- (ii) A tissue may act as a source or a sink at different times.

For each tissue listed below, state whether it is acting as a source, a sink or neither. The first one has been done for you.

tissue	source, sink or neither
a leaf in summer	source
a developing bud	
xylem	
an actively growing root tip	

[3]

- (b) The sap in the phloem sieve tubes is moved by mass flow.

State **two** adaptations of sieve tubes that enable mass flow to occur.

..... [2]

- (c) Describe how assimilates are loaded into the phloem.



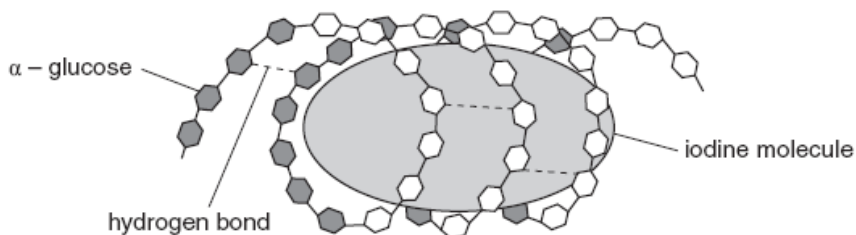
*In your answer, you should use appropriate technical terms, spelt correctly.*

..... [4]

5)

Fig. 2.1 shows part of an **amylose** molecule. This is an unbranched form of starch.

When iodine solution is added to starch, iodine fits into the helix of the amylose molecule, producing a colour change.



**Fig. 2.1**

(a) (i) State the colour of iodine solution in the presence of starch.  
 ..... [1]

(ii) Hydrogen bonds hold the amylose molecule in its helical shape.  
 Describe how a hydrogen bond is formed.  
 ..... [2]

(iii) Using the information in Fig. 2.1, suggest what would happen to the iodine-amylose complex if the solution was heated to 60 °C.  
 ..... [2]

(b) **Amylase** is an enzyme that hydrolyses amylose to maltose. Maltose, like glucose, is a reducing sugar.

A student investigated the action of amylase on amylose. She mixed amylase with amylose and placed the mixture in a water bath.

Describe how she could measure the change in concentration of maltose (reducing sugar) as the reaction proceeds.

*In your answer, you should ensure that the steps in the procedure are sequenced correctly.*  
 ..... [7]

(c) Fig. 2.2 shows the results that the student obtained from a practical procedure in which the rate of formation of maltose was measured in the presence and absence of chloride ions.

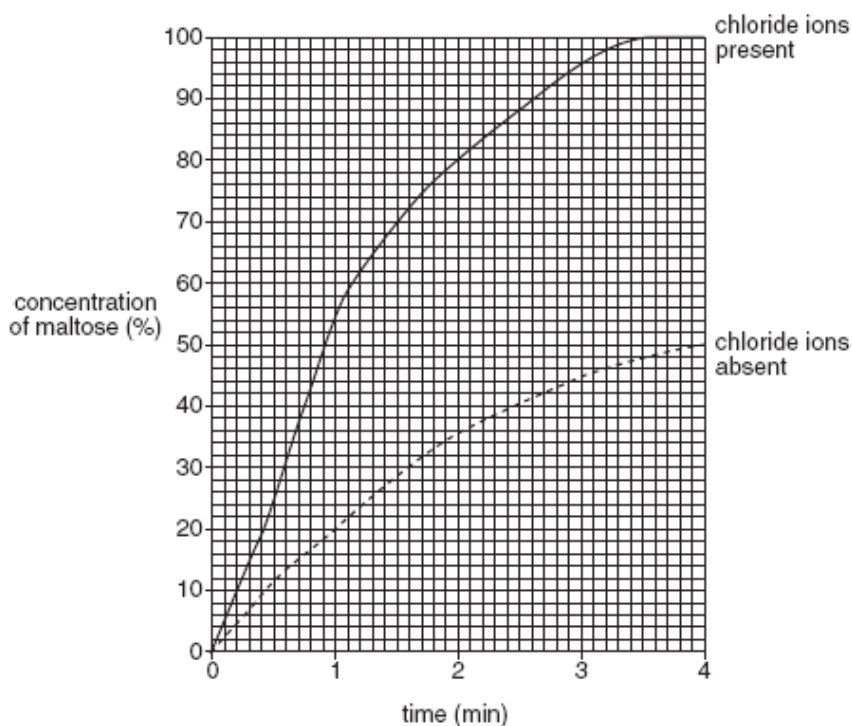


Fig. 2.2

(i) Describe the effect of chloride ions on the rate of reaction.

..... [2]

(ii) Suggest how chloride ions have this effect on the rate of reaction.

..... [2]

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(iii) State **three** variables that need to be controlled in this practical procedure in order to produce valid results.

..... [3]

[Total: 19]