Revision Questions with sources

National 5 - Cell Biology

Papers 2003 - 2012

Instructions:

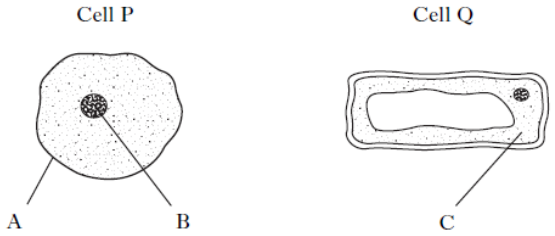
Write in Pencil (erase and reuse), or use paper to record your answers.
Use for 15-20 minutes per day
Check answers using official SQA mark schemes.
The year from which the question was taken is noted above each question. Find the appropriate Mark Scheme and compare your answer with the Mark Scheme.
Pay attention to the answers which **aren't** permitted.
Mark Schemes are available from the SQA website (sqa.org.uk).
Simply Choose Biology at the appropriate level.
Few questions at the appropriate level are available for DNA and the Production of Proteins (a couple of Higher questions have been added – but please be assured, you are not expected to answer at a Higher level, they simply reflect the content you are expected to know, the understanding is at National 5 level.

Contents:

Cell Structure, incl. Uses of Cells.

Intermediate 2 2010

1. (*a*) The diagram below shows two cells P and Q.



(i) Complete the table below to give the name and function of the parts labelled A, B and C.

Letter	*Part*	*Function*
A	cell membrane	
B	nucleus	
C		site of cell activities

2

(ii) Which cell is a plant cell? Give a reason for your choice.

Cell _____

Reason _____ **1**

(*b*) Cells have commercial and industrial uses.

(i) One type of cell is used in the production of yoghurt.

(A) Name the type of cell used in the production of yoghurt.

_____ **1**

(B) Name the milk sugar used by these cells.

_____ **1**

Intermediate 2 2010

1. (b) (continued)

(ii) Underline **one** option in each set of brackets to make the following sentence correct.

Gasohol is produced when cells act on sugar to produce { alcohol / methane } which is then mixed with { ethanol / petrol }. **1**

(iii) Fungal cells are used to produce antibiotics. What is the function of antibiotics in the treatment of disease?

_____ **1**

Intermediate 2 2011

2. (a) Yeast cells have many industrial and commercial uses.

The sentences below describe some of the uses of yeast cells.

Underline **one** option in each set of brackets to make the following sentences correct.

Yeast cells are { bacteria / fungi } that produce { carbon dioxide / oxygen } which makes bread rise. Yeast cells are also used in the production of { biogas / gasohol }. **2**

(b) Explain how milk is converted into yoghurt by bacteria.

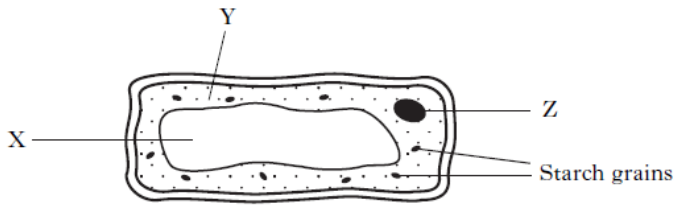
_____

_____

_____ **2**

Intermediate 2 2011

1. (a) The diagram below represents a potato cell.



(i) Name the parts of the cell labelled X and Y.

X _____

Y _____ **1**

(ii) Give the function of structure Z.

_____ **1**

(b) Name the enzyme involved in the synthesis of starch in potato cells.

_____ **1**

(c) Give **one** difference and **one** similarity in the structure of plant and animal cells.

Difference _____

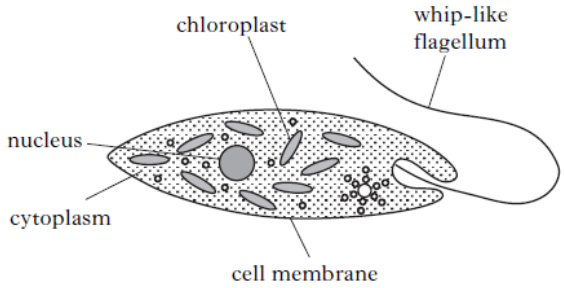
_____ **1**

Similarity _____

_____ **1**

Intermediate 2 2008

1. (*a*) *Euglena* is a single celled organism.
The diagram below shows some of the structures within *Euglena*.



(i) *Euglena* has structures found in most cells.

Complete the table below to show the names of these structures and their functions.

Structure	*Function*
	controls the entry and exit of materials
Cytoplasm	
Nucleus	

2

(ii) Name the structure that identifies *Euglena* as a plant cell.

_____

1

(*b*) Most plant cells have a cell wall.
Name the structural carbohydrate in the cell wall.

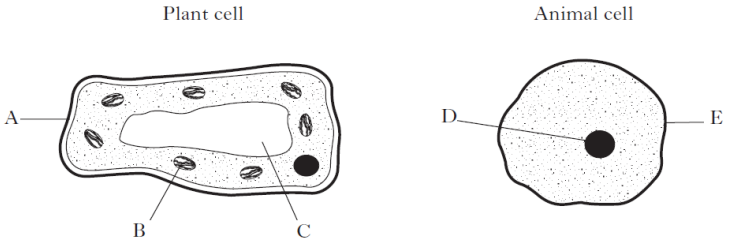
_____

1

Transport across Cell Membranes

Intermediate 2 2012

1. The diagrams below show two cells.



(*a*) Complete the table below to show the names and functions of some of these labelled parts.

Part	*Name*	*Function*
B	chloroplast	
C		contains cell sap
E	cell membrane	

2

(*b*) (i) The plant cell is placed in a hypertonic solution.
Describe the appearance of the plant cell after one hour.

_____

_____

1

(ii) Explain why the animal cell would stay the same size when it is placed in an isotonic solution.

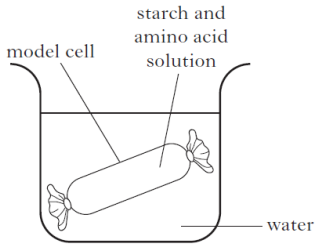
_____

_____

2

Intermediate 2 2013

4. (*a*) A model cell was made using a visking tubing bag filled with a starch and amino acid solution. It was placed into a beaker of water and left for two hours.



(i) Amino acids were detected in the water outside the model cell.

What process is responsible for this movement?

_____ **1**

(ii) Why would no starch be detected in the water outside the model cell?

_____

_____ **1**

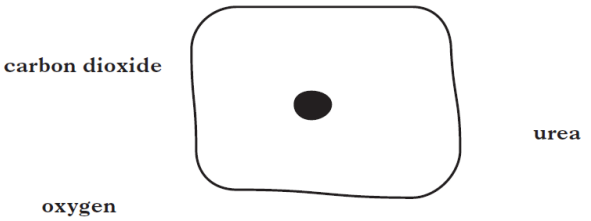
(iii) What would happen to the mass of the model cell during the two hour period? Explain your answer.

Mass of model cell _____

Explanation _____

_____ **2**

(*b*) The diagram below represents a respiring liver cell carrying out deamination.



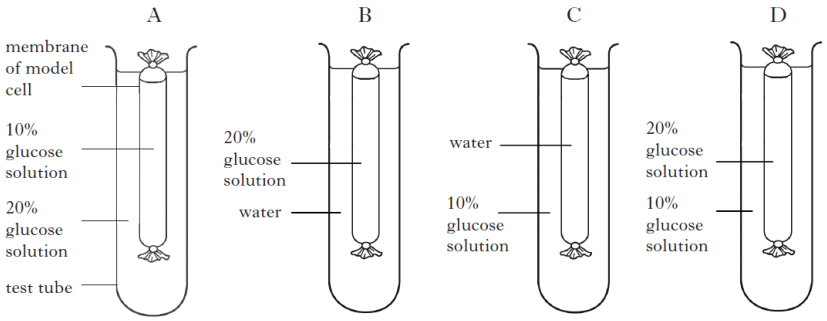
Complete the diagram above by adding **arrows** to show the direction of movement of urea, carbon dioxide and oxygen into or out of the cell. **2**

Intermediate 2 2012

4. The following diagrams show an investigation into osmosis using four model cells.

The model cells were weighed before placing them in the test tubes.

After one hour the model cells were taken out of the test tubes and reweighed.



(*a*) What feature of the membrane of the model cell makes it suitable for this investigation?

_____ 1

(*b*) State the letters of the model cells which would have increased in mass after one hour.

_____ 1

(*c*) What should be done to the model cells before each weighing to obtain valid results?

_____ 1

(*d*) Predict which model cell would have the greatest change in mass after one hour.

Give a reason for your choice.

Model cell _____ 1

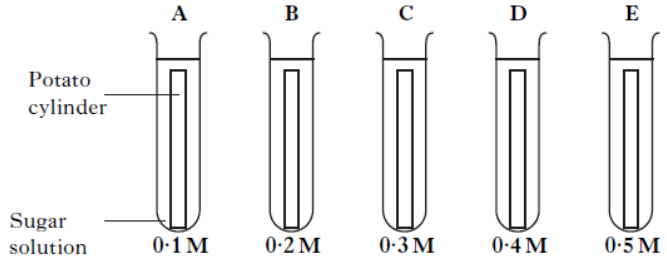
Reason _____

_____ 1

Intermediate 2 2008

4. A student cut five similar cylinders from the same potato, dried them with a paper towel and weighed them.

Each cylinder was placed in a different concentration of sugar solution as shown in the diagram below:



After three hours, the student removed the cylinders from the solutions, dried and weighed them as before.

The results are shown in the table below.

Test tube	*Concentration of sugar solution* (M)	*Initial mass of potato cylinder* (g)	*Final mass of potato cylinder* (g)	*Change in mass of potato cylinder* (g)	*Percentage change in mass of potato*
A	0·1	2·0	2·2	+0·2	+10
B	0·2	2·0	2·1	+0·1	+5
C	0·3	2·0	1·8	–0·2	–10
D	0·4	2·0	1·7	–0·3	
E	0·5	2·0	1·5	–0·5	–25

(*a*) Complete the table by calculating the **percentage change in mass** of the potato cylinder in 0·4 M sugar solution.

Space for calculation

1

(*b*) (i) Name the variable altered in this investigation.

_____ 1

(ii) Suggest one way in which the reliability of the results could be improved.

_____ 1

4. (*b*) (continued)

(iii) Would the results be valid if the cylinders were **not** dried before being weighed? Tick (✓) the correct box.

Valid ☐ Not valid ☐

Explain your answer.

Explanation _____

_____

_____ 1

(*c*) (i) State the letter of one test tube containing a potato cylinder in a **hypertonic** solution.

Letter _____ 1

(ii) Predict the appearance of the potato cylinder in test tube E after three hours.

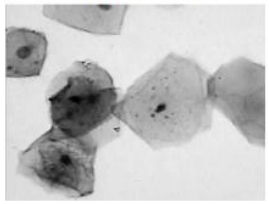
_____ 1

Intermediate 2 2009 Section C

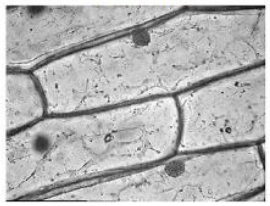
Q1B

B. The diagrams below show animal and plant cells in isotonic solutions.
These diagrams are not to scale.

Animal cells



Plant cells

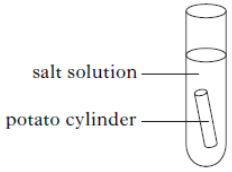


Describe the osmotic effect of transferring

(*a*) the animal cells into a hypotonic solution (water)

(*b*) the plant cells into a hypertonic solution (strong salt). 5

3. An investigation was carried out to find the effect of salt solutions of different concentrations on the mass of potato tissue. Five test tubes were set up as shown below, each containing a different concentration of salt solution.



Each potato cylinder was weighed, placed in the solution and left for an hour. Each cylinder was then reweighed and the percentage (%) change in mass was calculated.

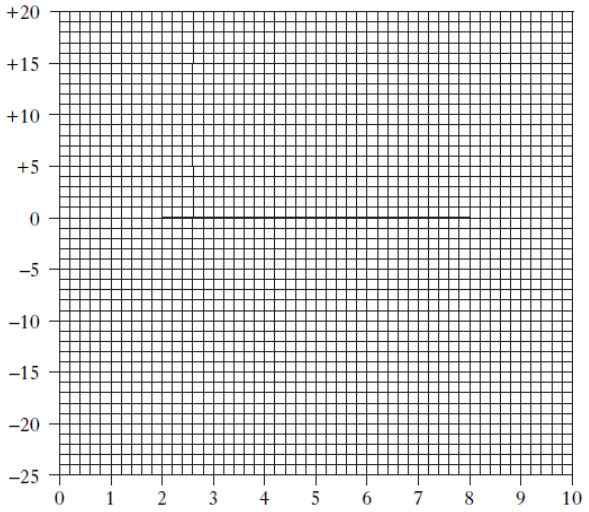
The table below shows the results of the investigation.

Salt concentration ($g/100\,cm^3$)	*Change in mass* (%)
1	+15
3	+10
6	–5
8	–15
10	–20

(*a*) (i) Add the appropriate label to each axis. **1**

(ii) Construct a **line graph** using the results given in the table. **1**

(Additional graph paper, if required, will be found on *Page thirty*.)



3. (continued)

(*b*) Time was kept constant in this investigation.

Name **two** other variables which must be kept constant.

1 _____

2 _____ **1**

(*c*) Using the results given, state the salt concentration which is isotonic to the potato tissue. Explain your answer.

Isotonic concentration _____ g/100 cm^3 **1**

Explanation _____

_____ **1**

(*d*) Predict the salt concentration that would produce a 10% decrease in mass.

_____ g/100 cm^3 **1**

10. Read the following passage and answer the questions based on it.

Robert Hooke (born 1635 – died 1703)

Robert Hooke was a scientific genius. His interests included physics, astronomy, chemistry and biology.

Hooke's special contribution to biology was the invention of the many-lensed compound microscope (Figure 1). With it, Hooke observed a huge variety of organisms in great detail. He used his artistic skills to draw what he saw in his book *Micrographia*, which was published in 1665.

Figure 1

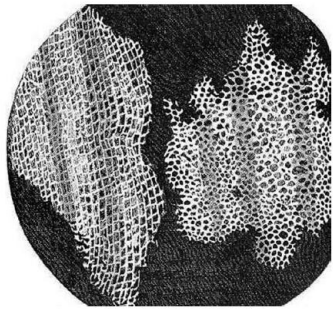


Figure 2

Probably Hooke's most famous microscopic observation was his study of thin slices of cork (Figure 2). He wrote "I could plainly see it to be all perforated and porous, much like a honeycomb, but that the pores were not regular. These microscopic pores or cells were indeed the first I ever saw, and perhaps, that were ever seen." Hooke had discovered plant cells. In fact it was Hooke who decided to call them "cells". He also reported seeing similar structures in other plants.

Hooke's microscope was a great improvement on Antony van Leeuwenhoek's single-lensed microscope. In 1678, van Leeuwenhoek wrote to the Royal Society to report his discovery of "little animals". He said "They were so small that I judged that even if 100 of these were laid end to end they would not reach the length of a millimetre." Hooke was asked by the Society to confirm van Leeuwenhoek's findings and did so successfully. As a result, Hooke became the founder of the study of cell biology and microbiology.

(*a*) What age was Robert Hooke when he published *Micrographia*?

Space for calculation

10. (continued)

(*b*) What was the main difference between Robert Hooke's compound microscope and the microscope invented by Antony van Leeuwenhoek?

_____

_____ **1**

(*c*) Give **one** similarity and **one** difference which Hooke noted between a honeycomb and cork cells.

Similarity _____ **1**

Difference _____ **1**

(*d*) What part of plant cells make up the structure of cork as seen by Robert Hooke?

_____ **1**

(*e*) We now know that the "little animals" mentioned in the passage vary from 0·002 millimetres to 0·008 millimetres.

Explain how this information proves that Leeuwenhoek's estimate of their size was correct.

Space for calculation

Explanation _____

_____

_____ **1**

Standard Grade Credit 2008

9. (*a*) The diagram below contains some of the stages of cell division by mitosis.

Describe **Stages 2** and **5** in the spaces provided.

Stage 1

Chromosomes become visible as pairs of identical chromatids.

↓

Stage 2

↓

Stage 3

The spindle fibres contract pulling the chromatids of each chromosome to opposite poles of the cell.

↓

Stage 4

A nuclear membrane forms around each nucleus.

↓

Stage 5

1

1

(*b*) Mitosis ensures that all daughter cells in a multicellular organism have the same number and type of chromosomes.

Explain why this is necessary.

_____

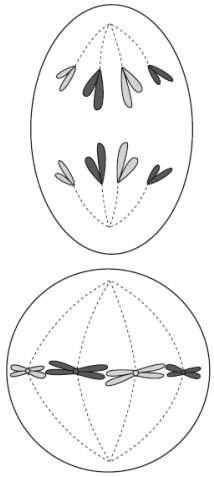
_____

1

Standard Grade Credit 2012

9. (*a*) The diagrams below show two stages of mitosis in cells.

Draw **one** straight line from each diagram to its correct description.



chromosomes shorten and thicken

chromosomes line up at the centre of the cell

chromatids are pulled to opposite ends of the cell

nuclear membrane reforms

2

(*b*) How does mitosis ensure that the daughter cells will be able to function properly?

_____

_____

1

Standard Grade Credit 2011

8. (continued)

(*c*) The following is a description of the stages of mitosis.

Stage 1 — Chromosomes become visible as pairs of chromatids

↓

Stage 2

↓

Stage 3 — Pairs of chromatids attach to the spindle near the middle of the cell

↓

Stage 4

↓

Stage 5 — Daughter chromosomes gather at the ends of the cell

↓

Stage 6 — The cytoplasm divides

Describe stages 2 and 4 in the spaces below.

Stage 2 _____

_____

Stage 4 _____

_____ **2**

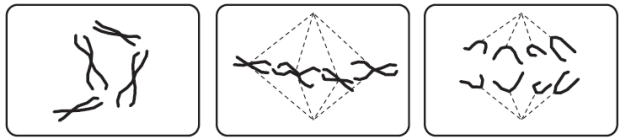
(*d*) Daughter cells produced by mitosis each have the same chromosome complement as the original cell. Why is this important?

_____

_____ **1**

Standard Grade Credit 2007

8. (*a*) Stages of mitosis are shown in their correct order in the diagrams below.



Stage A Stage B Stage C

(i) Label the spindle on one of the diagrams. **1**

(ii) Stage C would be followed by stage D. Describe what would happen in stage D.

_____

_____ **1**

(*b*) Typical timings of the stages of mitosis are shown in the table below.

Stage	A	B	C	D
Time (minutes)	88	33	25	54

What percentage of the total time for mitosis is taken by stage C?

Space for calculation

_____ % **1**

(*c*) Scientists can grow liver tissue in the laboratory. This is done by making a few liver cells divide by mitosis to form a large mass of cells.

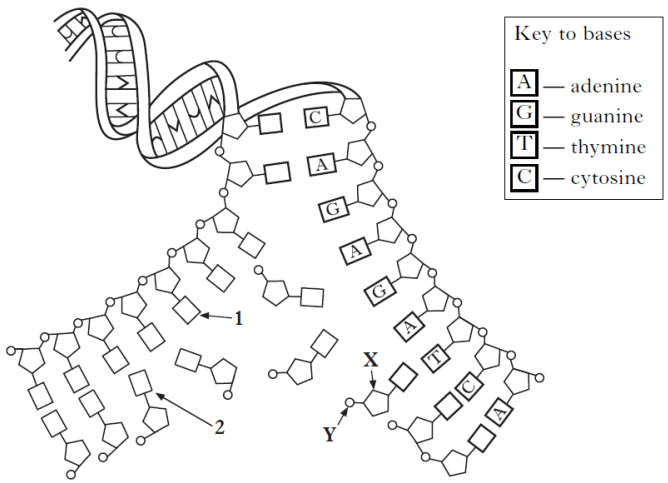
Why is it important that the daughter cells contain the same number of chromosomes as the original mother cells?

_____ **1**

DNA and the Production of Proteins

Higher Biology 2010

4. (*a*) The diagram below shows part of a DNA molecule during replication.



(i) Identify parts X and Y.

X _____

Y _____ **1**

(ii) Name bases 1 and 2.

1 _____

2 _____ **1**

(iii) Name **two** substances, not shown on the diagram, which are necessary for DNA replication.

1 _____

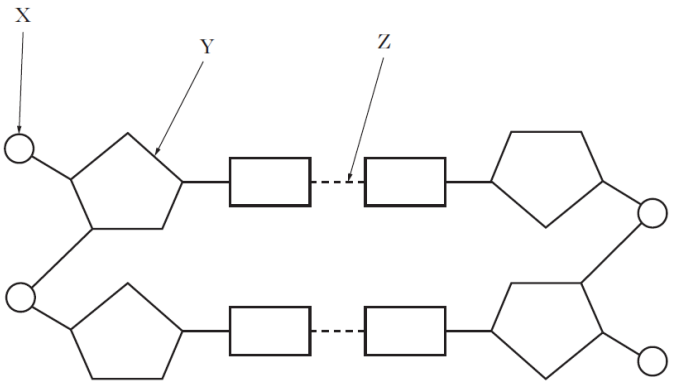
2 _____ **2**

(iv) Name a cellular process for which DNA replication is essential.

_____ **1**

Higher Biology 2013

1. (*a*) The diagram below shows part of a DNA molecule.



(i) Name components X and Y.

X _____

Y _____ **1**

(ii) Name the type of bond shown at Z.

_____ **1**

1. **(continued)**

(*b*) (i) The flowchart below describes steps in the process of DNA replication. Complete the boxes to describe what happens at **Step 2** and **Step 4**.

Step 1	Original DNA double helix unwinds.
⇩	
Step 2	
⇩	
Step 3	Free DNA nucleotides bond with complementary nucleotides on the original DNA strands.
⇩	
Step 4	
⇩	
Step 5	Double strands twist and two new DNA double helices are formed.

2

(ii) Other than the original DNA strand and free DNA nucleotides, give **one** substance needed for DNA replication.

_____

1

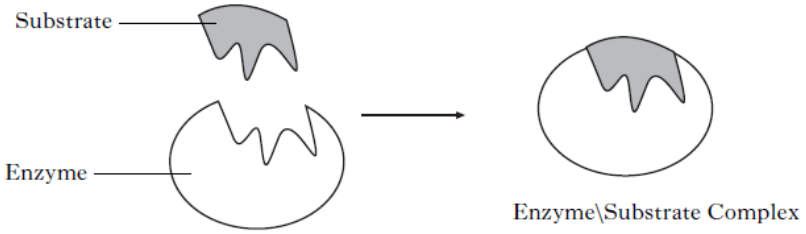
(iii) State the importance of DNA replication to cells.

_____

Proteins and Enzymes

Intermediate 2 2011

4. Enzymes are biological catalysts. The diagram below shows part of an enzyme controlled reaction.



(*a*) Describe the features of an enzyme which allow it to combine with only one substrate.

_____

_____

_____ 2

(*b*) What happens to an enzyme when it is boiled?

_____ 1

(*c*) Name a factor, other than temperature, which affects enzyme activity.

_____ 1

(*d*) Complete the following word equation for the enzyme catalase.

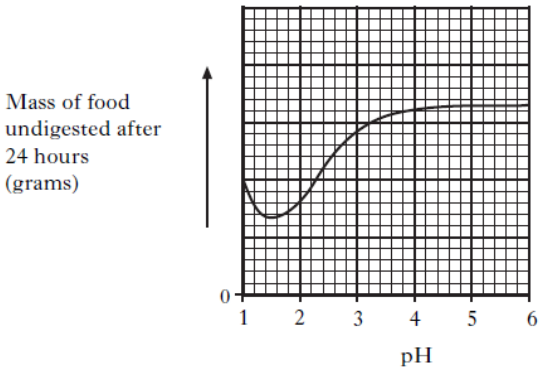
hydrogen peroxide $\xrightarrow{\text{catalase}}$ _____ and _____ 1

substrate **products**

Intermediate 2 2007

3. **(continued)**

(*c*) The graph below shows the results of an experiment into the activity of a stomach enzyme at various pH levels.



(i) Name a stomach enzyme.

_____ 1

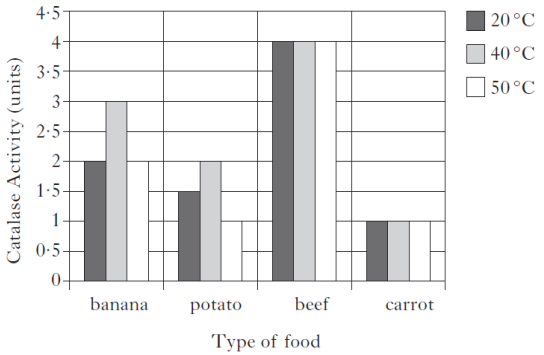
(ii) From the graph, what is the optimum pH of this enzyme?

pH _____ 1

Intermediate 2 2013

3. A student set up an investigation to measure the activity of catalase in a variety of foods at three different temperatures. *Marks*

The bar graph below shows the results recorded by the student.



(*a*) Describe the changes in catalase activity in banana when the temperature increased from 20 °C to 50 °C.

_____

_____ 1

(*b*) Calculate the percentage decrease in catalase activity in potato when the temperature increased from 40 °C to 50 °C.

Space for calculation

_____ % 1

(*c*) Using the results for **banana and potato** only, state the temperature that gave the highest catalase activity.

_____ °C 1

(*d*) What conclusion can be drawn about catalase activity using the results for **carrots** only?

_____

_____ 1

(*e*) Predict the catalase activity in beef at 100 °C. Give a reason for your answer.

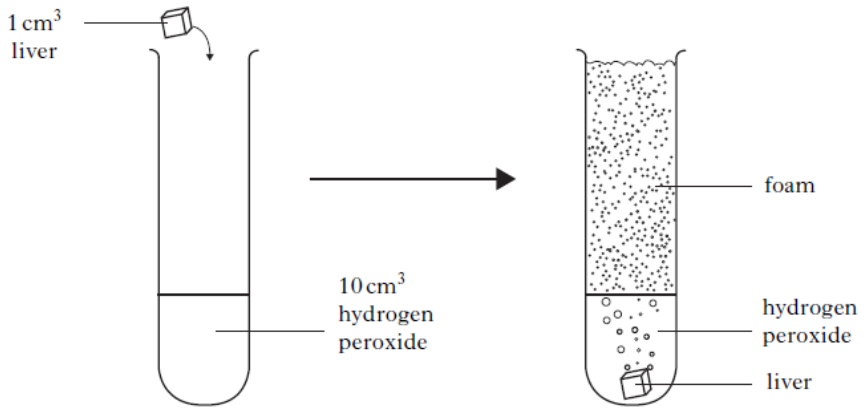
Prediction _____ units

Reason _____

_____ 1

Intermediate 2 2010

2. (*a*) Liver contains the enzyme catalase. A piece of liver was added to hydrogen peroxide and foam was produced as shown below.



(i) Name the gas in the foam.

_____ 1

(ii) Which other product was formed during this reaction?

_____ 1

(iii) Describe a control which would be used to show that active catalase is needed for this experiment.

_____

_____ 1

(iv) How could the activity of catalase be measured in this experiment?

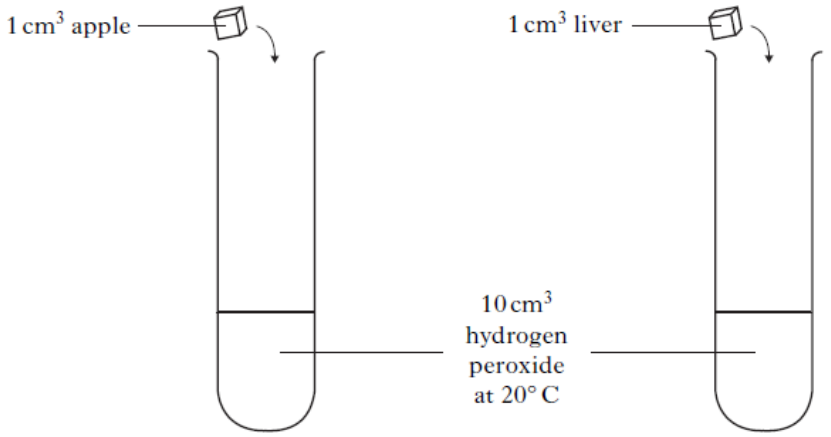
_____

_____ 1

Intermediate 2 010

2. (continued)

(*b*) The diagram below shows an investigation to compare the activity of catalase in apple and liver.



State **two** variables, not shown in the diagram, that must be kept constant for a valid comparison.

1 _____

2 _____

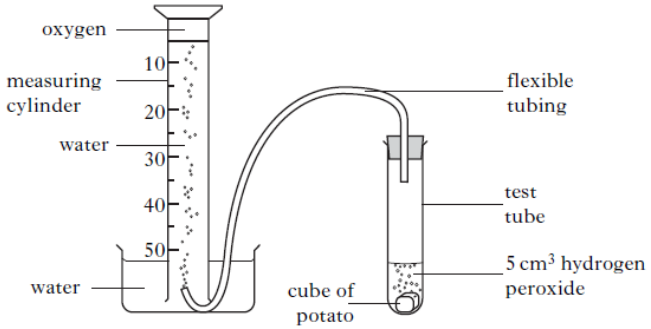
(*c*) Explain why enzyme activity decreases at temperatures above the optimum.

_____

_____

4. (*a*) Four groups of students investigated the catalase concentration of different tissues.

Each group set up a test-tube containing 5 cm^3 of hydrogen peroxide and a cube of potato. The oxygen was collected over a 3 minute period and the volume was measured as shown in the diagram below.



This procedure was repeated by each group using cubes of liver, apple and carrot.
The results from the four groups are given in the table below.

Tissue	*Volume of oxygen collected in 3 minutes* (cm^3)				
	Group 1	*Group 2*	*Group 3*	*Group 4*	*Average*
Potato	5·5	5·0	5·5	6·0	
Liver	39·5	37·0	42·5	35·5	38·5
Apple	1·0	1·5	1·0	0·5	1·0
Carrot	3·5	3·0	3·5	2·0	3·0

(i) Complete the table to show the average volume of oxygen collected for potato tissue.

Space for calculation

1

(ii) The volume of hydrogen peroxide and time taken to collect the oxygen were kept constant in this investigation.

State **two** other variables that must be kept constant.

1 _____ **1**

2 _____ **1**

4. (*a*) (continued)

(iii) What was done in this investigation to make the results reliable?

_____

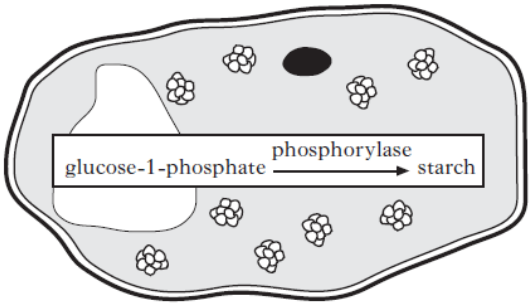
_____ 1

(iv) What conclusion can be drawn from these results?

_____

_____ 1

(*b*) The diagram below shows the action of the enzyme phosphorylase in a potato cell.



(i) Underline the option in the bracket to make the sentence correct.

The action of the enzyme phosphorylase catalyses the { synthesis / degradation } of starch. 1

(ii) State the effect of phosphorylase on the rate of this reaction.

_____ 1

(iii) Explain why lipase could not produce starch in this reaction.

_____

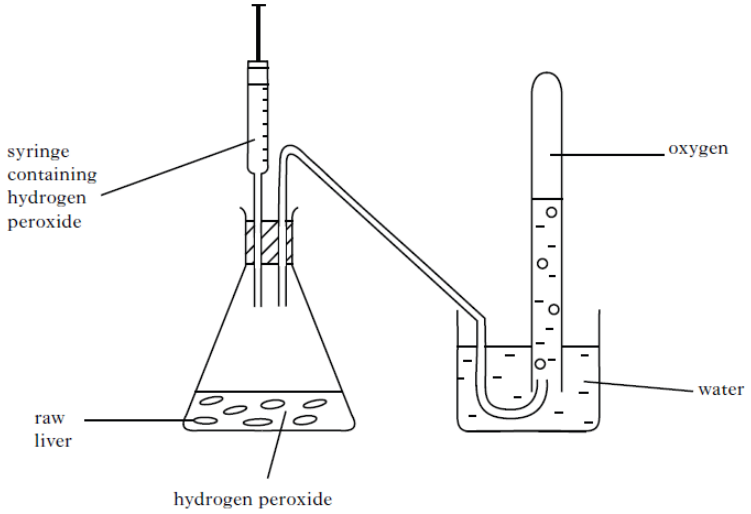
_____ 1

2. Liver contains the enzyme catalase which carries out the following reaction.

hydrogen peroxide ⟶ water + oxygen

The investigation shown below was carried out to demonstrate the effect of pH on catalase activity in liver.

Hydrogen peroxide of different pH values was added to 1 g of roughly chopped raw liver.



The time taken to collect 1cm^3 of oxygen was recorded and the results are shown in the table below.

pH of hydrogen peroxide solution	*Time to collect 1 cm^3 of oxygen* (seconds)			*Average time to collect 1cm^3 of oxygen* (seconds)
	Trial 1	*Trial 2*	*Trial 3*	
7	76	77	81	78
8	56	58	57	57
9	50	45	40	45
10	53	50	53	52
11	59	69	70	66

(*a*) From the table, state the optimum pH for catalase in liver.

_____ 1

2. **(continued)**

(*b*) Name the variable altered in this investigation.

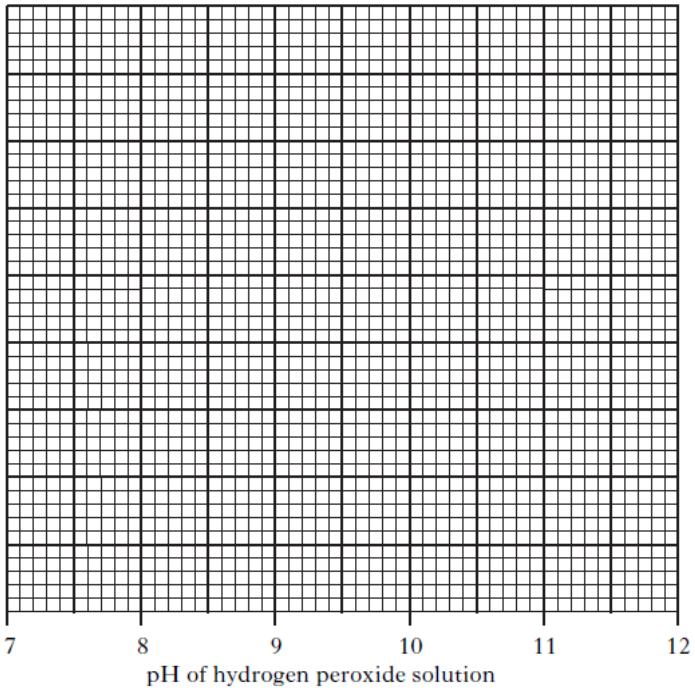
_____ 1

(*c*) Explain why the experiment was repeated at each pH value and averages calculated.

_____ 1

(*d*) Construct a line graph of the **average** time taken to collect 1 cm^3 of oxygen against pH of hydrogen peroxide solution.

(Additional graph paper, if required, will be found on *Page thirty-two*)



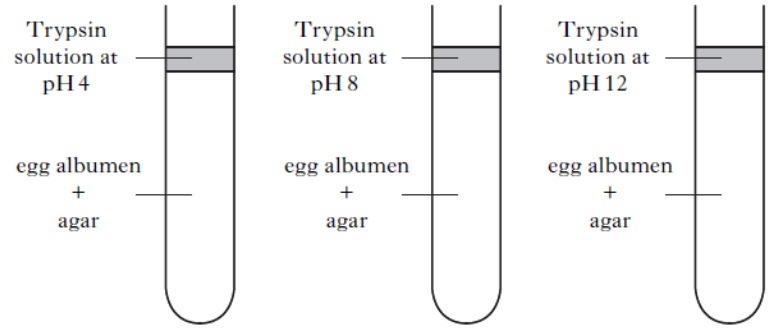
2

(*e*) Predict the average time to collect 1 cm^3 of oxygen at pH12.

_____seconds 1

Intermediate 2 2011

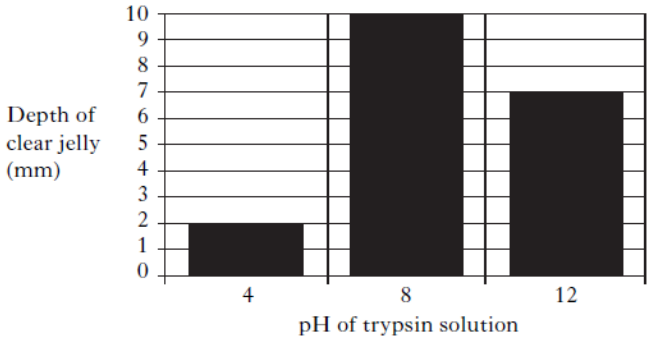
9. The diagram below shows an investigation into the effect of pH on the digestion of protein by trypsin.



Egg albumen is the source of protein. It is added to agar to give a cloudy, white jelly. When the egg albumen is digested the jelly turns clear.

The test tubes were left in a warm place for 24 hours. At the end of this time the depth of the clear jelly was measured.

The graph below shows results from this investigation.



(*a*) Describe trypsin activity as pH increases as shown in the graph.

_____

_____

_____ 2

9. (continued)

(*b*) Predict the depth of clear jelly with trypsin at pH 2.

_____ mm **1**

(*c*) Trypsin is produced by the pancreas. Name **two** other enzymes produced by the pancreas.

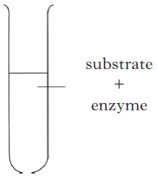
1 _____ **1**

2 _____ **1**

Marks

2. An investigation was carried out to find the effect of pH on the activity of an enzyme.

Substrate at different pH values was added to the enzyme in different test tubes.

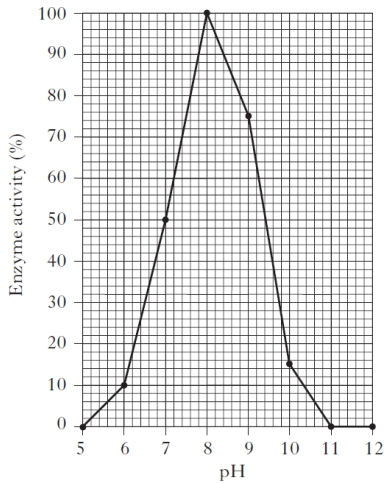


(*a*) State **two** variables that must be kept constant for a valid conclusion to be made from this investigation.

1 _____

2 _____ **2**

(*b*) The results of this investigation are shown in the graph below.



(i) What is the optimum pH for this enzyme?

_____ **1**

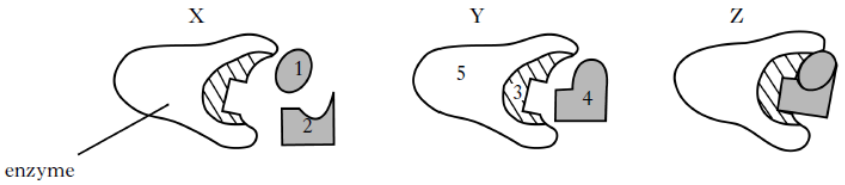
(ii) How many times more active is the enzyme at pH 9 than at pH 10?

Space for calculation

_____ times **1**

Intermediate 2 2009

1. (*a*) The diagram below shows three stages X, Y and Z that occur when an enzyme converts its substrate into a product.



(i) This enzyme promotes the breakdown of a complex molecule into simpler molecules.

Put the stages into the correct order to show this degradation reaction.

_____ → _____ → _____ **1**

(ii) Which number in the diagram shows the active site?

_____ **1**

(*b*) Complete the following sentence by underlining the correct word from the choice in brackets.

Enzymes are made of { carbohydrate / fat / protein }. **1**

(*c*) Describe what happens to an enzyme when it is denatured.

_____

_____ **1**

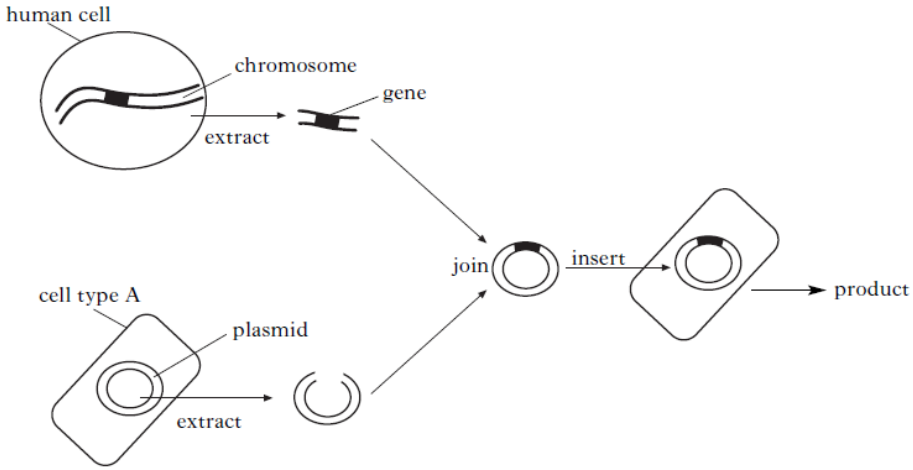
Intermediate 2 2008 Section C Q2B

B. Describe the properties of enzymes and the function of the enzyme phosphorylase in a synthesis reaction. **5**

Genetic Engineering

Intermediate 2 Section C 2008 Q1

B. The diagram below summarises a form of genetic engineering.



Identify cell type A and name a product of genetic engineering.
Describe the advantages and disadvantages of this process. **5**

Intermediate 2 Section C 2007 Q2

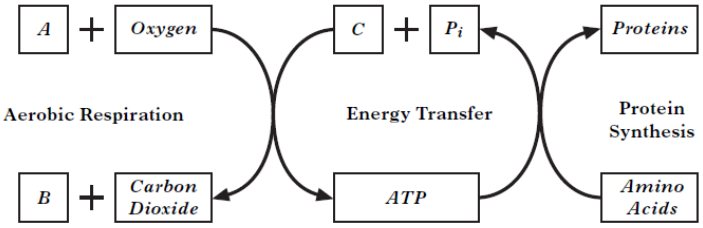
Labelled diagrams may be included where appropriate.

A. Genetic engineering uses bacteria to produce human insulin. Describe the stages involved in this process. **5**

Respiration

Intermediate 2 2008

3. (*a*) The diagram below shows the link between aerobic respiration and protein synthesis.



(i) Name substances A, B and C.

A _____

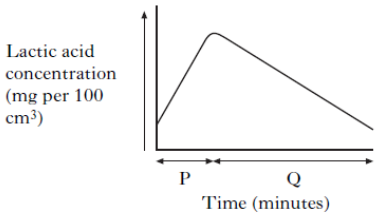
B _____

C _____ 2

(ii) Some energy released in respiration can be used for protein synthesis.
State one other cellular activity that uses energy.

_____ 1

(*b*) The graph below shows lactic acid concentration in blood during a period of vigorous exercise (P) and of complete rest (Q).



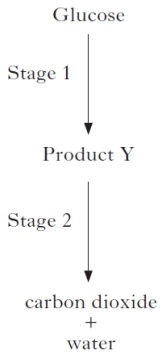
Explain why the lactic acid concentration changes during period Q.

_____

_____ 1

Intermediate 2 2012

3. The process of aerobic respiration in a muscle cell is outlined below.



(*a*) (i) Name Stage 1.

_____ 1

(ii) Name product Y from Stage 1.

_____ 1

(iii) What other substance must be present for Stage 2 to occur?

_____ 1

(*b*) ATP is formed during respiration and broken down for uses in cells.

(i) How many molecules of ATP are formed from each glucose molecule during

Stage 1 only? _____

Both Stage 1 and Stage 2? _____ 1

(ii) What **two** molecules are produced when ATP is broken down?

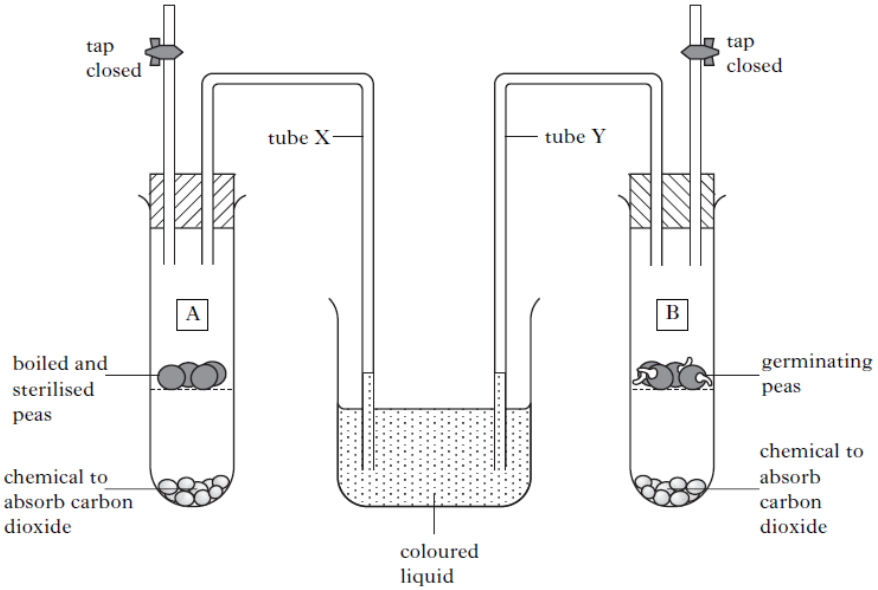
_____ and _____ 1

(iii) State **one** use of the energy released when ATP is broken down.

_____ 1

Intermediate 2 2007

2. (*a*) The experiment shown below was set up to demonstrate aerobic respiration in peas that are germinating (starting to grow).



After two days, the level of liquid had risen in tube Y but had not risen in tube X.

(i) Explain the purpose of A as a control in this experiment.

_____

_____ 1

(ii) Predict the effect on the level of the liquid in tube Y if a greater mass of peas is used.

_____ 1

2. **(continued)**

(*b*) The following list contains some features of aerobic and anaerobic respiration in germinating peas.

List

W Does not use oxygen
X Produces carbon dioxide
Y Yields 38 molecules of ATP per glucose molecule
Z Produces ethanol

Complete the table below by writing the letters from the list in the correct columns.

Each letter may be used once or more than once.

Aerobic respiration in germinating peas	*Anaerobic respiration in germinating peas*

2

Intermediate 2 2011 Section C Q2A

Labelled diagrams may be included where appropriate.

A. Describe the **two** stages of aerobic respiration **including** the names of the raw materials and products for **each** stage. 5

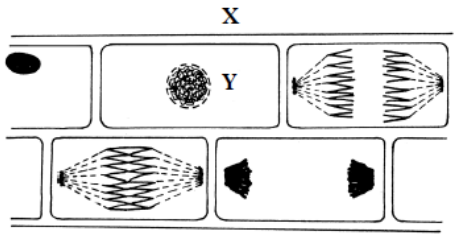
Intermediate 2 2010

3. (*a*) Cells need ATP for cell division. ATP is produced during the aerobic respiration of glucose.

How many ATP molecules are produced per glucose molecule in this process?

_____ 1

(*b*) The diagram below shows dividing root cells which carry out aerobic respiration.



Carbon dioxide is one waste product of aerobic respiration.

Tick (✓) the appropriate box below to show the direction of diffusion of carbon dioxide.

X ⟶ Y ☐

Y ⟶ X ☐ 1

(*c*) Aerobic respiration occurs in two stages. Name the first stage of aerobic respiration and a product, other than ATP.

Name _____ 1

Product _____ 1

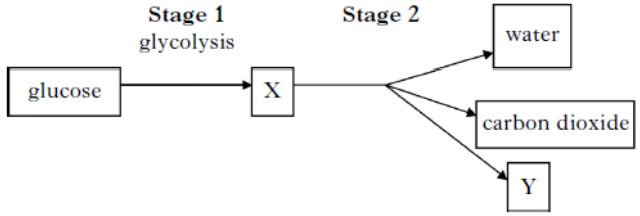
Intermediate 2 2009

3. Yeast may carry out two different types of respiration.

(*a*) Name the type of respiration in yeast which has the highest energy yield.

_____ 1

(*b*) The diagram below shows one type of respiration in yeast cells.



(i) Name substances X and Y.

X _____ 1

Y _____ 1

(ii) What other substance must be present for stage 2 to occur?

_____ 1

(*c*) Yeast cells are used in the brewing industry.

(i) Name the type of respiration involved.

_____ 1

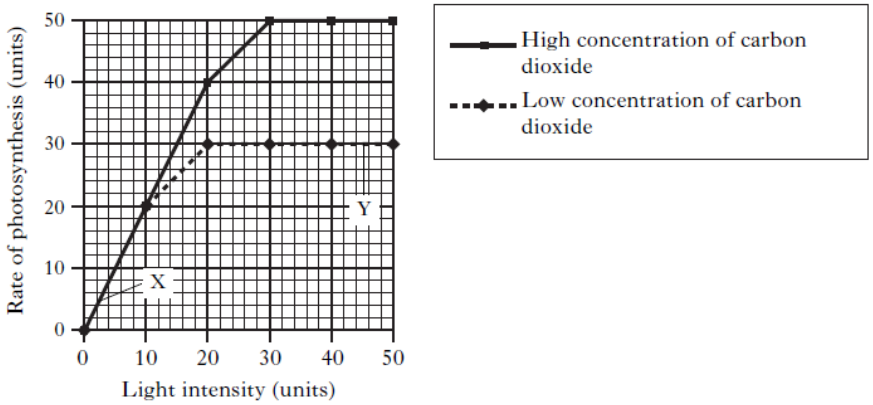
(ii) Explain why yeast cells are used in the brewing industry.

_____ 1

Photosynthesis

Intermediate 2 2010

4. The graph below shows the effects of two different environmental factors on the rate of photosynthesis.



(*a*) What are the limiting factors at points X and Y?

X _____ 1

Y _____ 1

(*b*) Suggest **one** way that the rate of photosynthesis can be measured.

_____

_____ 1

(*c*) During the first stage of photosynthesis, light energy is used.

(i) Where is light energy trapped in the cell?

_____ 1

(ii) State **one** use of this light energy.

_____ 1

Intermediate 2 2010

(*d*) (i) Name the second stage of photosynthesis.

_____ 1

(ii) Name the carbohydrate produced during the second stage of photosynthesis.

_____ 1

Intermediate 2 2008 Section C Q2A

2. Answer **either** A **or** B.

Labelled diagrams may be included where appropriate.

A. Describe the function of yeast in bread making and the anaerobic pathway of respiration involved in this process. 5

Intermediate 2 2013

5. (*a*) The sentences below give some information about photosynthesis. *Marks*

Underline **one** option in each set of brackets to make the sentences correct.

Photosynthesis uses {carbon dioxide / oxygen} to allow {fungi / green plants} to make their own food.

Some of this food is converted to {cellulose / starch} for making cell walls. 2

(*b*) Decide if each of the following statements about photosynthesis is **True** or **False**, and tick (✓) the appropriate box.

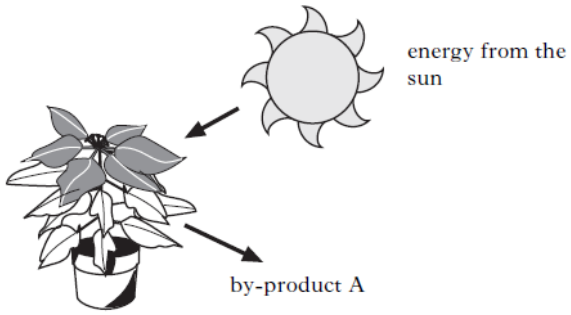
If the statement is **False**, write the correct word(s) in the **Correction** box to replace the word(s) underlined in the statement.

Statement	*True*	*False*	*Correction*
The first reaction in photosynthesis is called carbon fixation.			
Hydrogen is transferred from the first reaction to the second reaction.			
ADP is used as the energy source for the second reaction in photosynthesis.			

3

Intermediate 2 2008

2. Photosynthesis is the process by which green plants make glucose using energy from the sun.



(*a*) Name the by-product A released during photosynthesis.

_____ 1

(*b*) Hydrogen and a high energy molecule are produced during photolysis.

(i) Name the high energy molecule.

_____ 1

(ii) Describe the use of hydrogen in carbon fixation.

_____ 1

(*c*) (i) Explain why an increase in temperature can lead to an increase in the rate of photosynthesis.

_____

_____ 2

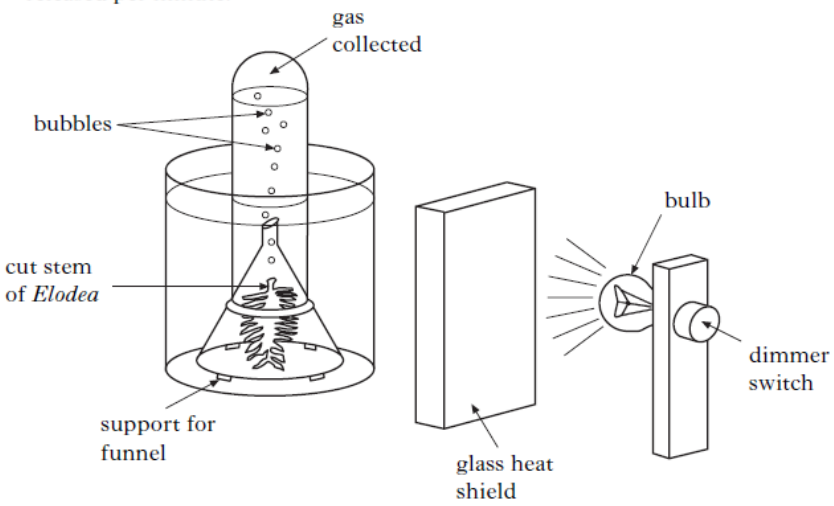
(ii) Other than temperature, state **two** limiting factors of photosynthesis.

1. _____

2. _____ 1

Intermediate 2 2007

7. (*a*) An experiment was set up to measure the effect of light intensity on the rate of photosynthesis in the water plant, *Elodea*.
The light intensity was varied using a dimmer switch on the bulb.
The rate of photosynthesis was measured by counting the number of bubbles released per minute.



(i) Name the gas collected.

_____ 1

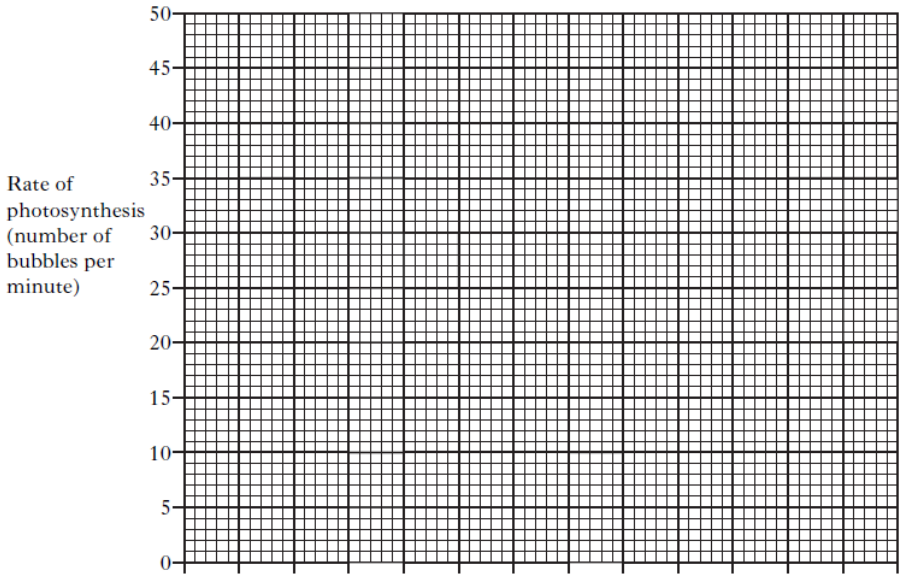
(ii) The results of the experiment are shown in the table below.

Light intensity (units)	*Rate of photosynthesis* (number of bubbles per minute)
1	2
3	10
5	23
8	45
10	45
12	45

7. (*a*) (ii) (continued)

(A) On the grid below, plot a line graph to show rate of photosynthesis against light intensity.

(Additional graph paper, if required, will be found on page 32.)



2

(B) Using the data in the table, explain the results obtained at light intensities greater than 8 units.

_____

_____ 1

(*b*) There are **two** reactions in photosynthesis. The first reaction is photolysis.

(i) Name the two substances produced by photolysis that are required for the second reaction.

Substance 1 _____

Substance 2 _____ 2

(ii) Name the second reaction.

_____ 1

7. (continued)

(*c*) Plant cells convert glucose into other carbohydrates.

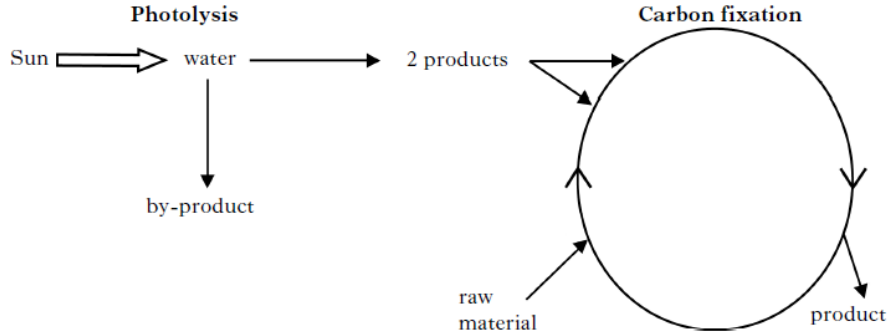
Complete the table below by naming two of these carbohydrates.

Role of carbohydrate in plant cells	*Name of carbohydrate*
Storage as an insoluble material	
Forms cell walls	

2

Intermediate 2 009 Section C Q1A

A. The diagrams below show the two stages of photosynthesis.



Describe what happens during the two stages

(*a*) photolysis

and

(*b*) carbon fixation. 5

Intermediate 2 2011 Section C Q2B

B. Describe the **two** stages of photosynthesis **including** the names of the raw materials and products for **each** stage. 5