

Cambridge IGCSE Biology



Classified Past Papers Paper 6

JOIN NOW



**click here to get
answers and
explanations**



- (a) A student investigated the effect of different concentrations of sucrose solution on the movement of water into and out of potato cells by osmosis.

Water enters cells if the solution outside the cells is less concentrated than the solution inside the cells.

Water exits cells if the solution outside the cells is more concentrated than the solution inside the cells.

Prepare a table to record your results in (a)(i).

The student was given four different concentrations of sucrose solution labelled **A**, **B**, **C** and **D**.

The student was also given four potato sticks which were cut to the same length and diameter.

- Step 1 The student measured the length of four potato sticks. The potato sticks for this step are shown in Fig. 1.1.

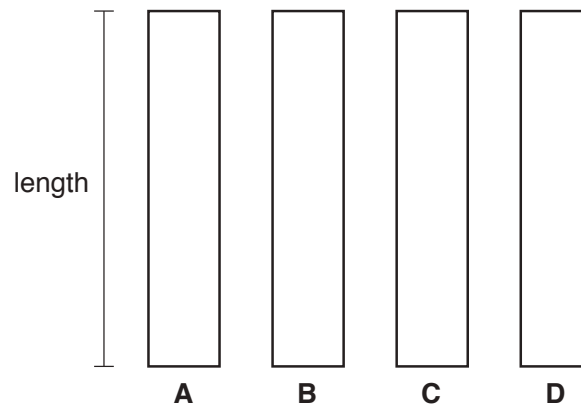


Fig. 1.1

- Step 2 The student labelled a large test-tube **A** and used a syringe to put 25 cm^3 of sucrose solution **A** into the large test-tube.
- Step 3 The student repeated step 2 using solutions **B**, **C** and **D** and three more large test-tubes. The student reused the syringe from step 2.



click here
for answers

Step 4 The student placed one potato stick into each of the four large test-tubes, **A**, **B**, **C** and **D**. This step is shown in Fig. 1.2.

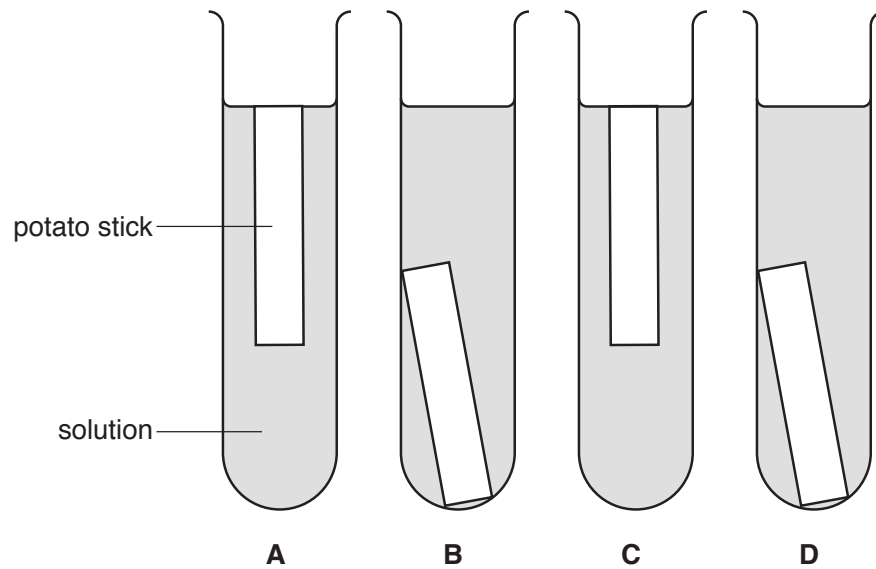


Fig. 1.2

Step 5 The potato sticks were left in the solutions for 30 minutes.

Step 6 After 30 minutes the student removed the potato sticks from the solutions and measured the length of each potato stick. The potato sticks for this step are shown in Fig. 1.3.

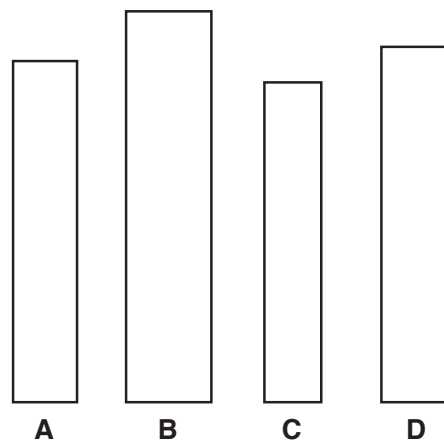


Fig. 1.3



- (i) Measure the length of each potato stick in Fig. 1.1 and Fig. 1.3 and record the results in your table in **(a)(i)**.

Prepare a table to record your results in the space provided.
Your table should show:

- the length of the potato sticks at the start
- the length of the potato sticks after 30 minutes
- the change in length of the potato sticks.

	Length of potato sticks / mm		
Potato stick	At the start	After 30 min	Change in length
A			
B			
C			
D			

[4]

- (ii) Suggest why it is important to compare the change in length rather than the final lengths of the potato sticks in this type of investigation.

It is possible that potatoes had different starting lengths

.....
.....[1]



- (b) The student examined each potato stick after the 30 minutes soaking time. Their observations are recorded in Fig. 1.4.

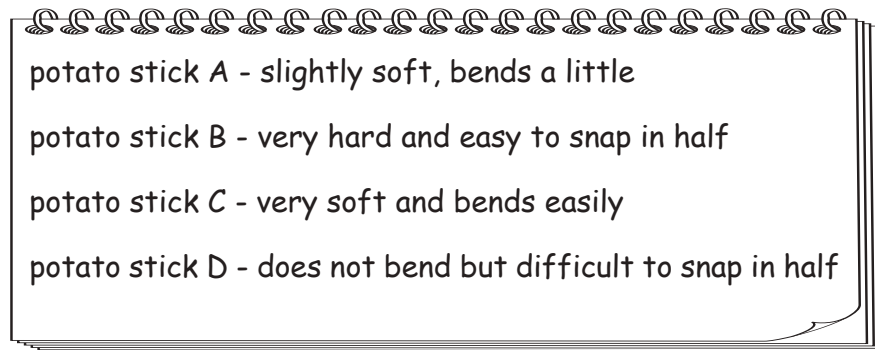


Fig. 1.4

- (i) Use the information in your table of results and in Fig. 1.2 and Fig. 1.4 to identify solutions **A, B, C** and **D**.

Write your answers in Table 1.1.

Table 1.1

relative concentration of sucrose solution	solution letter
least concentrated	B
↓	D
	A
most concentrated	C

[2]

- (ii) Explain how the results support your answer to part (b)(i).

B gained water because it is harder. C and D lost water as they are softer.

[3]

- (iii) Identify **one** source of error with the method and suggest an improvement.

error **Reuse of syringe** **Potatoes not from same type**

Evaporation of water from tubes

improvement **Use a new syringe everytime** **Use from same plant**

Cover tubes



- (iv) State **one** of the controlled variables for this investigation.

The volume of the sucrose solution is 25 cm³.

/ The soaking time is 30 minutes.

[1]

- (c) Another investigation was carried out into the effect of different concentrations of sucrose solution on potato sticks.

In this investigation students decided to measure the change in mass rather than the change in length.

The students followed a similar method to the one in your investigation but they left the potato sticks to soak for three hours instead of 30 minutes.

- (i) Suggest why the students left the potato sticks in the solutions for three hours instead of 30 minutes.

Change in mass takes a longer time.

[1]

- (ii) The students dried the potato sticks on paper towels before measuring the mass of each potato stick.

Suggest why this step was **not** important in the investigation described in 1(a), where length was measured.

Surface water does not affect the measurement of length.

[1]

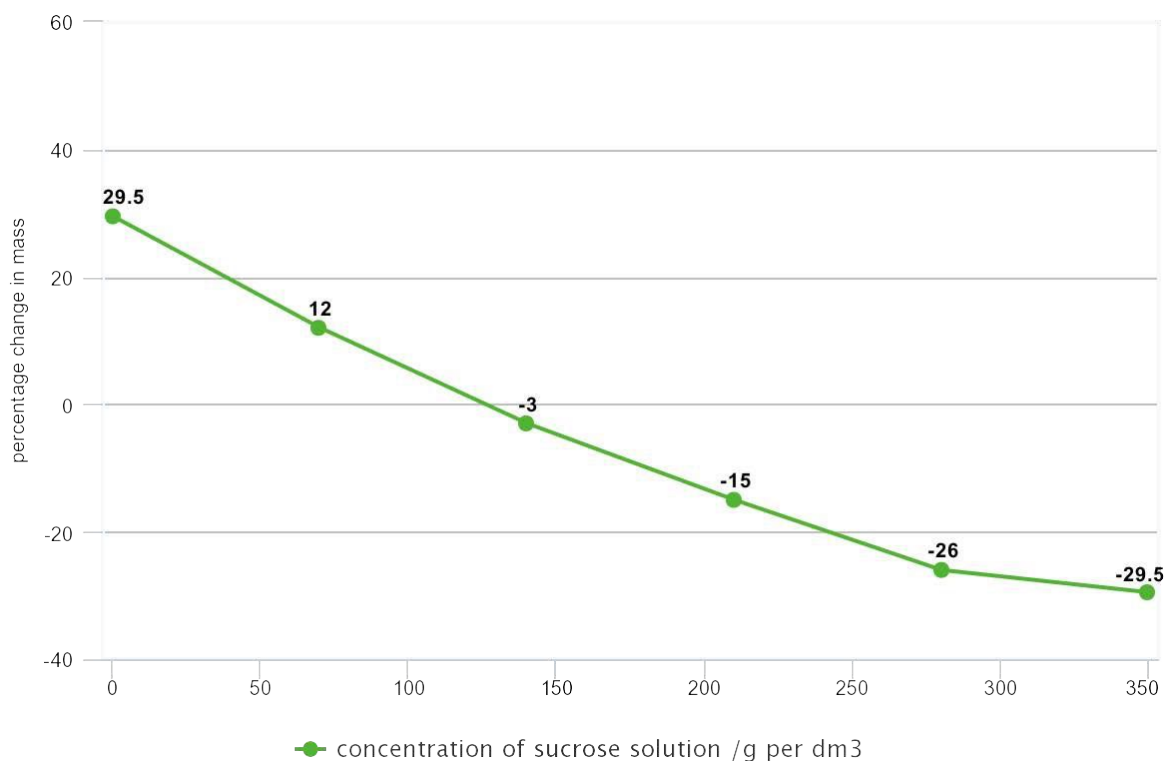
Table 1.2 shows their results.

Table 1.2

concentration of sucrose solution /g per dm ³	percentage change in mass
0	29.5
70	12.0
140	-3.0
210	-15.0
280	-26.0
350	-29.5



- (iii) Using Table 1.2, plot a graph on the grid to show the effect of the concentration of sucrose solution on the percentage change in mass.



[4]

- (iv) Use your graph to find the concentration of sucrose solution that would cause **no change** in mass of the potato stick.
Mark this point on your graph with a + and record the concentration.
Include the unit.

Value and unit from graph

..... [2]

- (v) Students tested other potatoes and found different values for the concentration of sucrose solution that would cause no change in mass.

Suggest **one** reason for this.

Potatoes could have different age
/ variety than the ones used in the first experiment

..... [1]

[Total: 22]



- 3 Fig. 1.1 shows a bird's egg. Part of the shell has been removed.

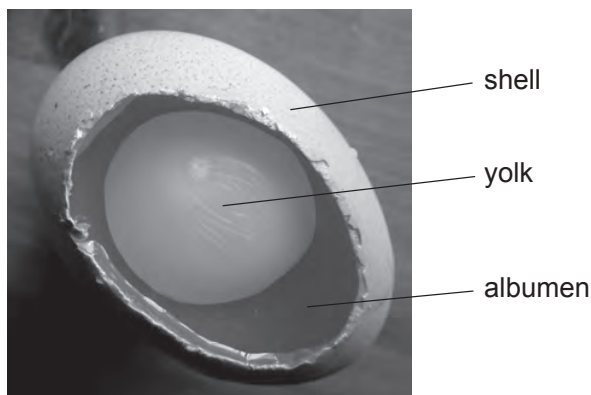


Fig. 1.1

Approximately 90 % of albumen is water. The remaining 10 % is made up of other substances such as reducing sugar.

- (a) Describe how you could safely test a sample of albumen for reducing sugar.

Measure a fixed volume of albumen.

Add drops of Benedict's reagent.

Heat in a water bath.

Wear goggles for safety.

[4]

- (b) A student tested some albumen for the presence of protein using Biuret reagent. The solution changed colour. It was a positive result.

Describe this colour change.

From blue to purple / violet

[1]



click here
for answers



(c) Fig. 1.2 shows an experiment to investigate the effect of acid on albumen.

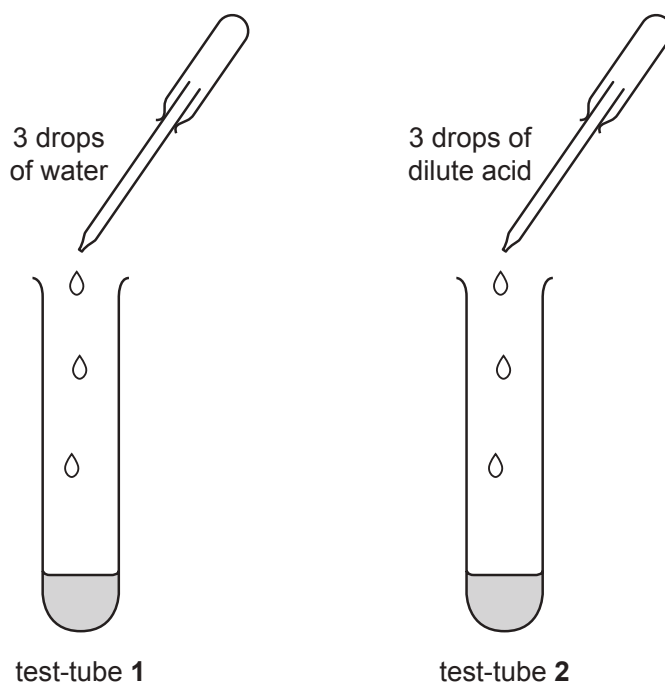


Fig. 1.2

The test-tubes were observed after five minutes.
The results are shown in Table 1.1.

Table 1.1

test-tube	observation
1	stayed as a clear liquid
2	changed from a clear liquid to a white solid

(i) State a conclusion that can be made from these results.

Acid denatures the protein albumen.

[1]

(ii) State why water was added to test-tube 1.

The control is used to ensure the acid causes the change in

[1]



- (d) Fat is present in the yolk.
A student carried out the emulsion test on a sample of yolk and it gave a positive result.
State what the student would observe.

White emulsion

[1]

- (e) Two students wanted to investigate the effect of concentration of acid on albumen.

For this investigation, suggest a suitable:

variable to change; Concentration of the acid

variable to measure or observe; Amount of solid forms

variable to control. temperature / volume of acid / volume of [3]

[Total: 11]



- 5 Starch is broken down into reducing sugars in the alimentary canal. The digested products are absorbed into the blood.

Some students investigated the action of enzymes on the digestion of starch.

- (a) Describe how you would carry out a test for starch.

Iodine solution changes colour when it reacts with starch.
The colour shifts from brown to blue-black. [2]

- (b) Describe how you would safely carry out a test for reducing sugars.

Add drops of Benedict's reagent.
Heat in a water bath at 80°C .
Wear goggles for safety.
The colour changes from blue to green, yellow, orange, [3]



click here
for answers

The students used a length of tubing that had been securely tied at one end.

- 5 cm³ of starch solution and 5 cm³ of enzyme solution were added to the tubing.
- A knot was used to close the open end of the tubing.
- The outside of the tubing was rinsed with water.
- The tubing was supported as shown in Fig. 1.1.

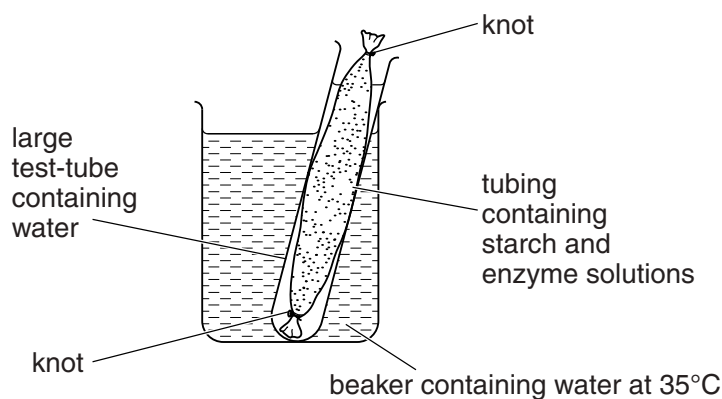


Fig. 1.1

- (c) Suggest why the starch and enzyme solutions were kept at 35°C.

Optimum temperature for enzyme activity [1]



- 2 cm³ were removed immediately from the water in the large test-tube. One drop was placed on a white tile to test for starch. The remainder was placed in a test-tube to test for reducing sugar. This was sample 1.
- Four further samples were removed at 10 minute intervals. Each sample was tested for starch and reducing sugar.

(d) (i) Complete Table 1.1 by writing in the observations for the five reducing sugar tests.

Table 1.1

sample	time / min	observation	conclusion
1	0	Blue	none
2	10	Green	very little
3	20	Yellow	some present
4	30	Orange	more sugars present
5	40	Red	large amount present

[3]

(ii) The observations for the starch tests were all brown.

Explain what can be concluded from these observations.

no starch is present (starch couldn't move out)

[1]

(e) Suggest **and** explain what happened during the 40 minutes to give the results in (d)(i) and (d)(ii).

Starch is broken down into reducing sugars.

Sugars diffuse out through the walls of the tubing into water.

[4]



- (f) Explain why each of the following procedures was carried out:
- (i) the outside of the tubing was rinsed before it was placed in the large test-tube of water;

 To remove starch from the outside of the tubing.
[1]
- (ii) a white tile was used for the starch test.

 To colour change clearly
[1]
- (g) (i) Suggest which region of the alimentary canal is represented by the tubing.
 Give a reason for your answer.

 Villi are found in the ileum of the small intestine.

[2]
- (ii) State the name of the enzyme that works in the alimentary canal to break down starch.

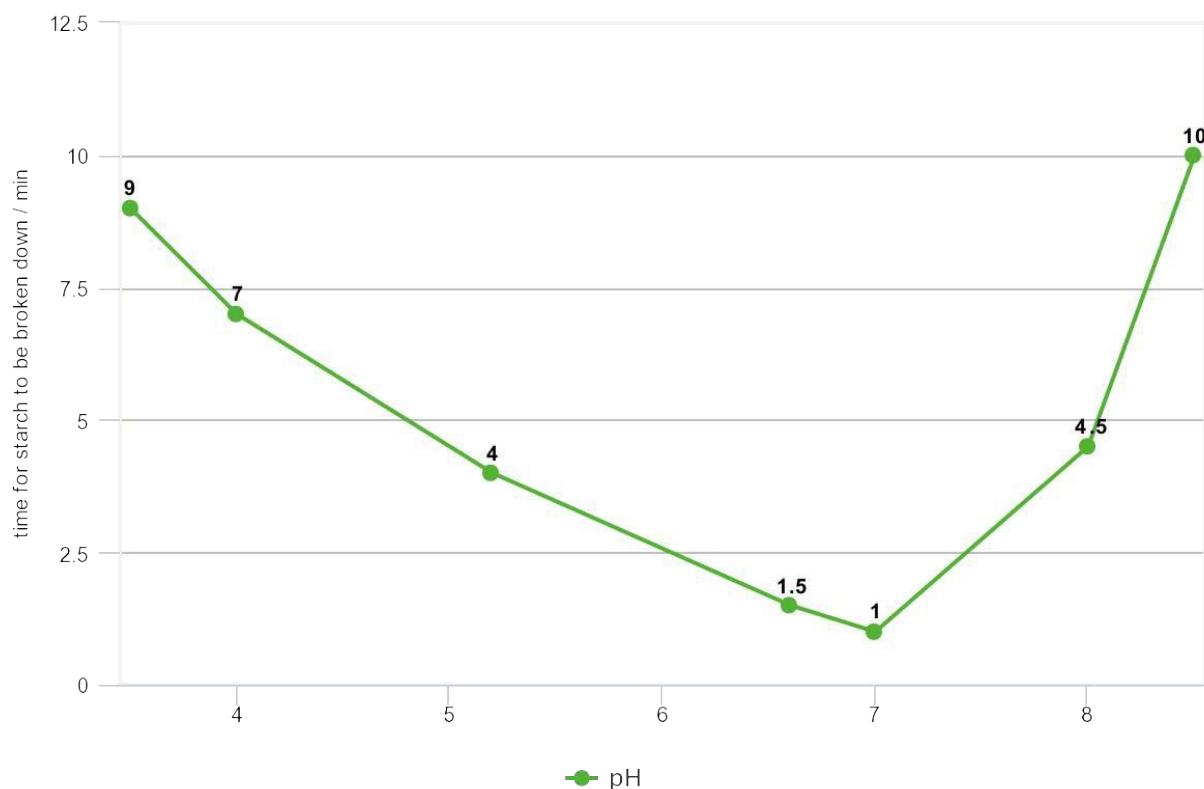
 Amylase
[1]
- (h) Some students investigated the effect of pH on the activity of this enzyme.
 Their results are shown in Table 1.2.

Table 1.2

pH	time for starch to be broken down / min
3.5	9.0
4.0	7.0
5.2	4.0
6.6	1.5
7.0	1.0
8.0	4.5
8.5	10.0



(i) Plot a graph to show the results in Table 1.2.



[4]

(ii) Use the graph to suggest the optimum (best) pH for this enzyme.

pH = 7 [1]

(iii) Describe the effect of pH on the activity of this enzyme.

Enzyme activity slows down over time.
As pH increases, enzyme activity increases below the optimum pH.

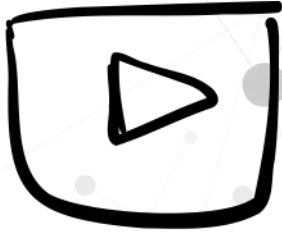
[3]

(iv) Suggest a suitable control for this investigation.

Use a boiled enzyme / use water instead of enzyme [1]



The Complete Course for IGCSE Biology



Videos that cover the entire syllabus



Exam-expert solved past papers

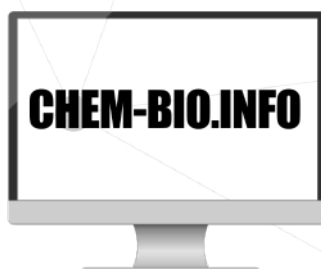
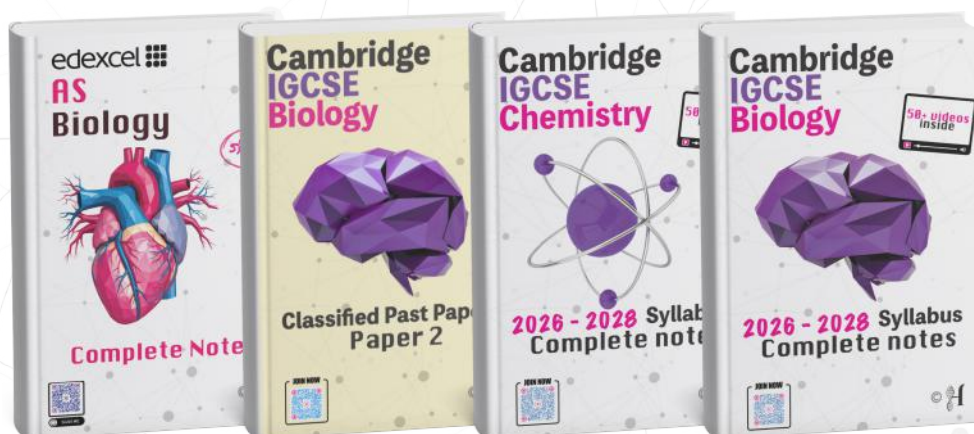


Test your knowledge on each topic.

JOIN NOW



Also Available:



WHATSAPP



 **51375709**

 **50144115**

 **chem_bio.info**