



Rewarding Learning

General Certificate of Secondary Education
2022–2023

Centre Number

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Candidate Number

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Double Award Science: Biology

Unit B1

Foundation Tier



[GDW11]

GDW11

WEDNESDAY 22 FEBRUARY 2023, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **8(a)**.

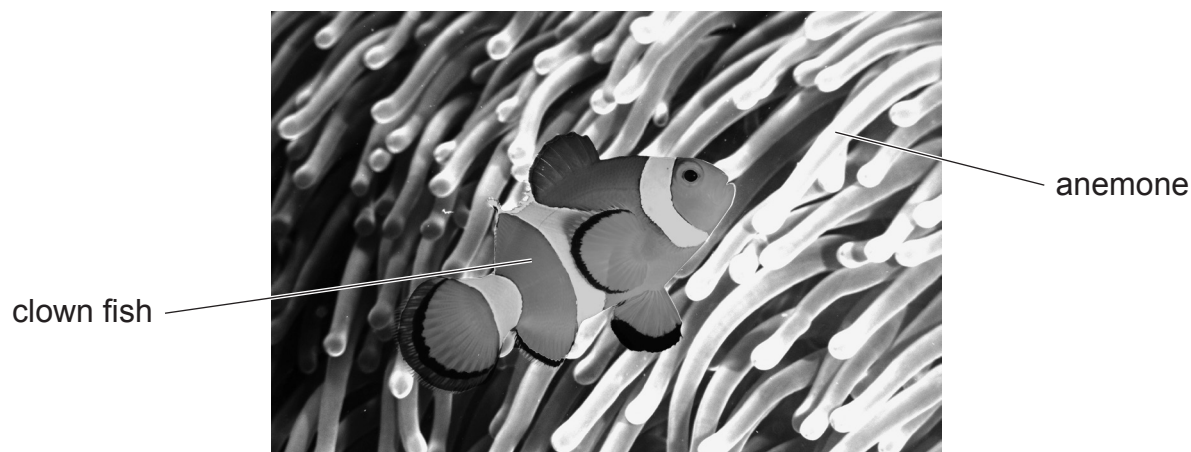
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20GDW1101

- 1 Many different types of organisms live in coral reefs in the ocean. Coral reefs need sunlight, salt water and warm temperatures for these organisms to survive.

The photograph shows two organisms that live in coral reefs.



- (a) Use a ruler to draw a line between each statement and the correct ecological term.

Statement	Ecological term
coral reef	population
one anemone	habitat
total number of clown fish in the coral reef	competition
clown fish, anemones, and all other living organisms in the coral reef	organism
	community

[4]



- (b) Different factors affect the organisms in the coral reef.
What type of factor is salt water?

[1]



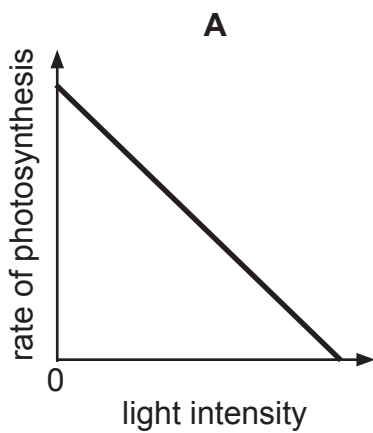
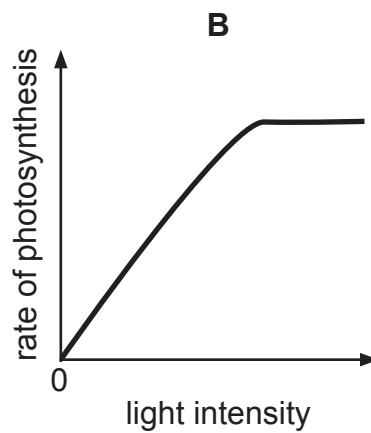
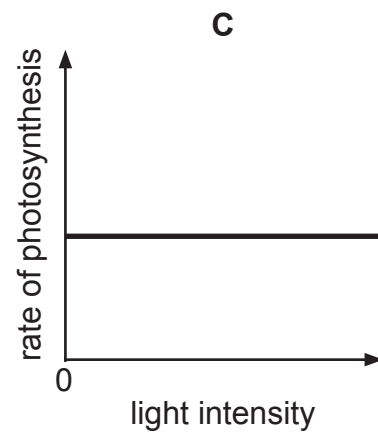
- 2 Photosynthesis is the process that plants use to make food. Plants can store this food as a **complex** carbohydrate.

(a) Name this complex carbohydrate.

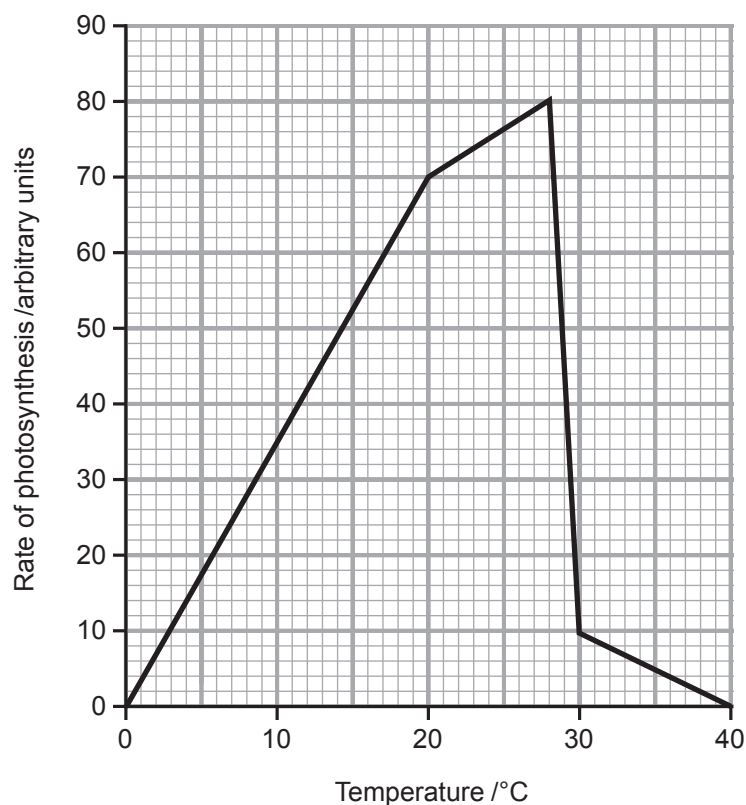
[1]

Light intensity affects the rate of photosynthesis.

- (b) Circle the letter of the graph that shows the effect of increasing light intensity on the rate of photosynthesis. [1]



- (c) The graph shows the effect of temperature on the rate of photosynthesis in a plant.



- (i) What temperature gives the **maximum** rate of photosynthesis in this plant?

_____ °C [1]

Photosynthesis needs carbon dioxide and water.

- (ii) Suggest why photosynthesis does not take place at 0 °C.

_____ [1]

[Turn over



- 3 In the carbon cycle, carbon is removed and returned to the atmosphere as carbon dioxide.

The table gives some of the processes involved in the carbon cycle.

Complete the table to show whether each process:

- adds carbon dioxide to the atmosphere
- removes carbon dioxide from the atmosphere
- does **not** add or remove carbon dioxide from the atmosphere.

Write a tick (✓) in **one** empty box for **each process**.

Process	Adds carbon dioxide to the atmosphere	Removes carbon dioxide from the atmosphere	Does not add or remove carbon dioxide from the atmosphere
combustion			
feeding			
respiration			
photosynthesis			

[4]





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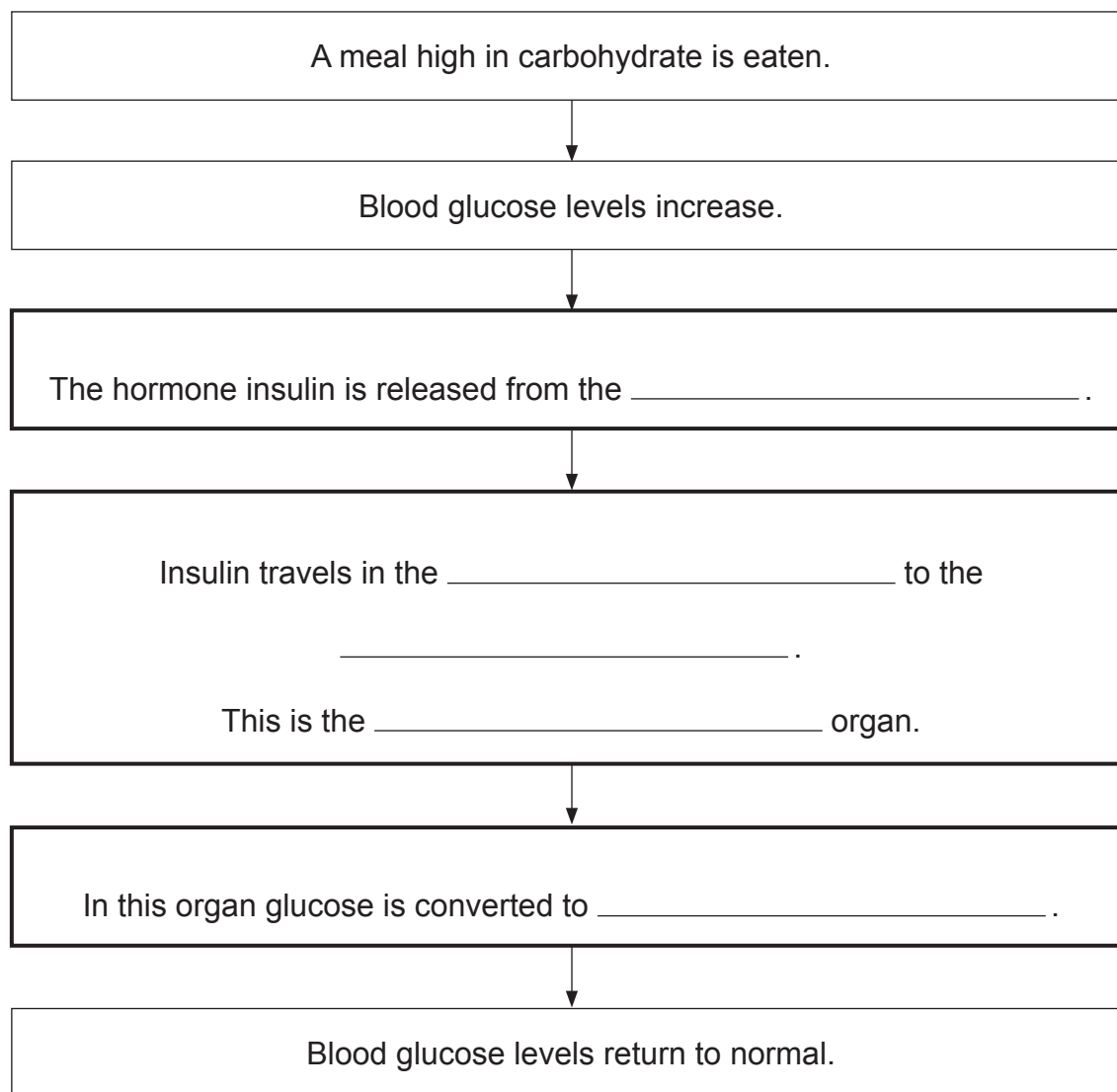
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(Questions continue overleaf)



- 4 The hormonal system is one communication system in the body.
The flow chart shows what happens when blood glucose levels increase and insulin is produced.

(a) Complete the flow chart by writing the correct words on the blank lines in the boxes.



[5]



(b) Diabetes is a condition in which the blood glucose control mechanism fails.

The table gives some statements about diabetes.

Letter	Statement
A	Insulin production stops.
B	Always treated with insulin.
C	Increased exercise can reduce the risk of diabetes.
D	Usually occurs early in life.
E	Is linked to obesity.
F	Long term effects can include eye damage.

There are two types of diabetes, Type 1 and Type 2.

(i) Give the letters of the statements that apply **only** to Type 1 diabetes.

_____ [3]

(ii) Give the letter of the statement that applies to **both** Type 1 and Type 2 diabetes.

_____ [1]

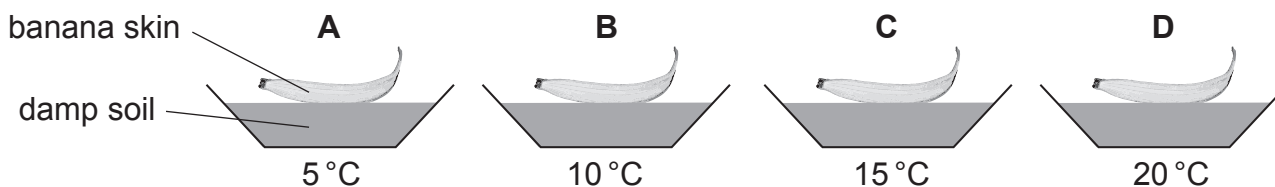
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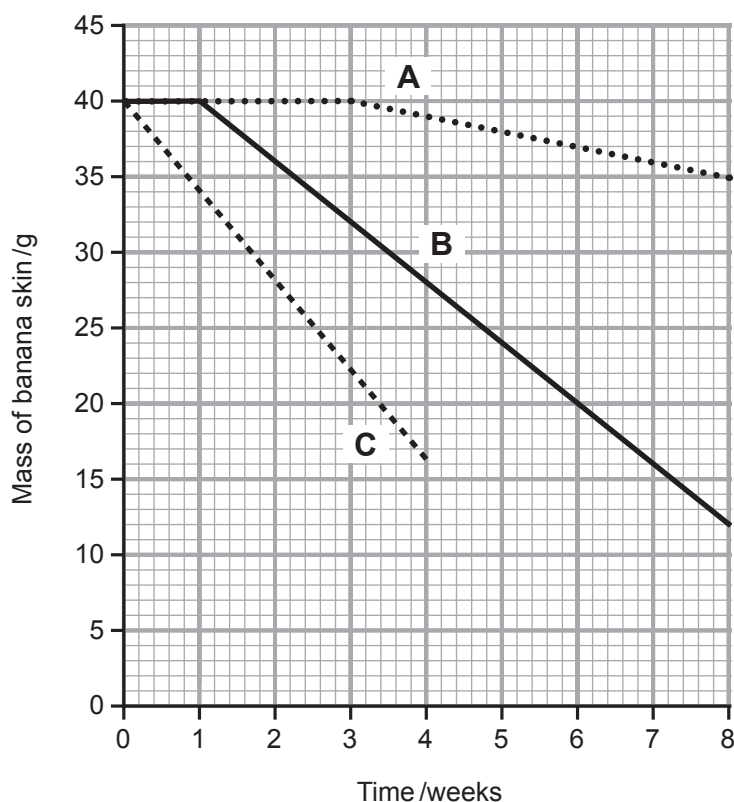
- 5 A student carried out an investigation into the decomposition of banana skins at different temperatures. He used banana skins of the same mass and placed them on damp soil.

He recorded the mass of the banana skins at the start of the investigation and every week for eight weeks.

The diagram shows the set-up of his investigation.



The graph shows his results for banana skins A, B, and C.



(a) (i) Use a ruler to extend the line for banana skin **C** to find the time when it had completely decomposed. [1]

(ii) Give the time when the banana skin **C** had completely decomposed.

_____ weeks [1]

(b) Give **two** differences in the trends for banana skins **A** and **B** over the eight weeks of the investigation.

Suggest an explanation for these differences. Data is **not** required.

Difference 1: _____

Difference 2: _____

Explanation: _____

_____ [3]

(c) Banana skin **D** was half the mass of banana skin **C** after three weeks.
Calculate the mass of banana skin **D** after three weeks.

_____ g [1]

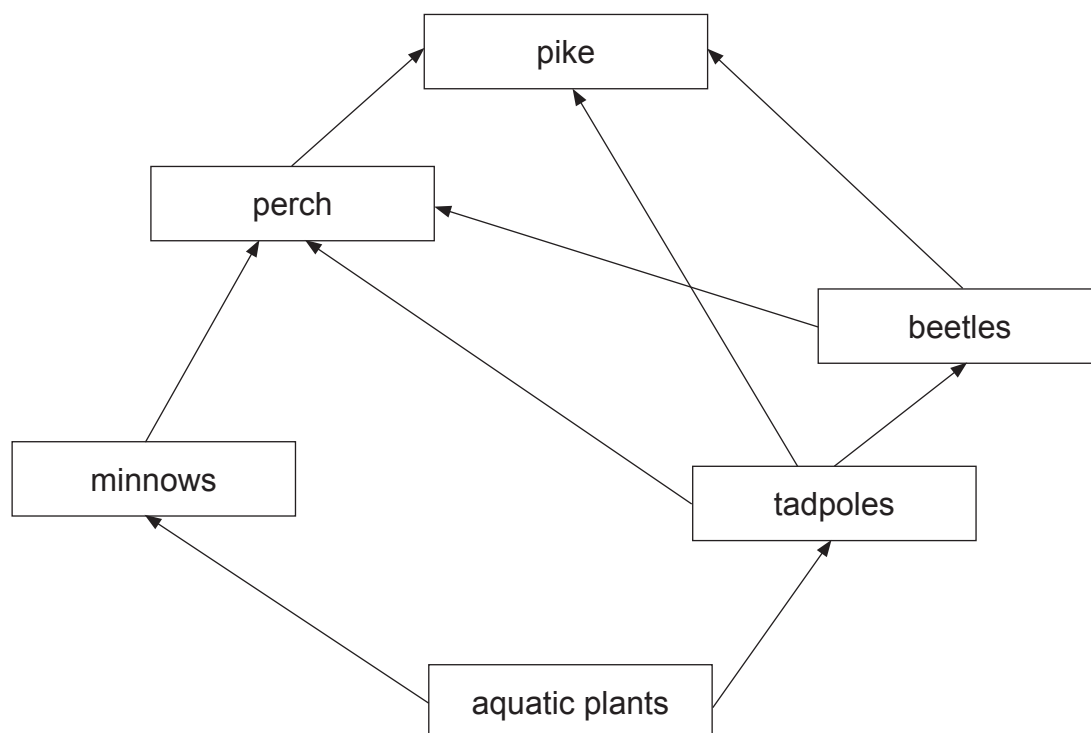
(d) The student repeated his investigation with **dry** soil.
Suggest how this could affect decomposition of the banana skins.
Explain your answer.

_____ [2]

[Turn over



6 The diagram shows a food web from a river.



The table gives the position(s) of two organisms in this food web.

(a) Complete the table by writing a tick (✓) in the correct empty boxes for the other organisms in this food web.

Organism	producer	primary consumer	secondary consumer	tertiary consumer
pike			✓	✓
minnows		✓		
beetles				
tadpoles				
aquatic plants				
perch				

[4]



- (b) The number of tadpoles decreased in this river. This caused an **increase** in the population of minnows. Explain why.

[2]

[Turn over]

13825



20GDW1113

- 7 The kidneys filter blood and produce urine.
The kidneys filter blood at a rate of 0.12 litres per minute.

(a) (i) Calculate how much blood is filtered by the kidneys per **day**.

Show your working.

_____ litres per day [2]

The kidneys produce and pass out 1.5 litres of urine per day.

(ii) Calculate the percentage (%) of the blood filtered by the kidneys per day that is passed out as urine.

Give your answer to **two** decimal places.

Show your working.

_____ % [3]

(b) The body loses water as urine, by the evaporation of sweat and by one other process.

(i) Name this other process.

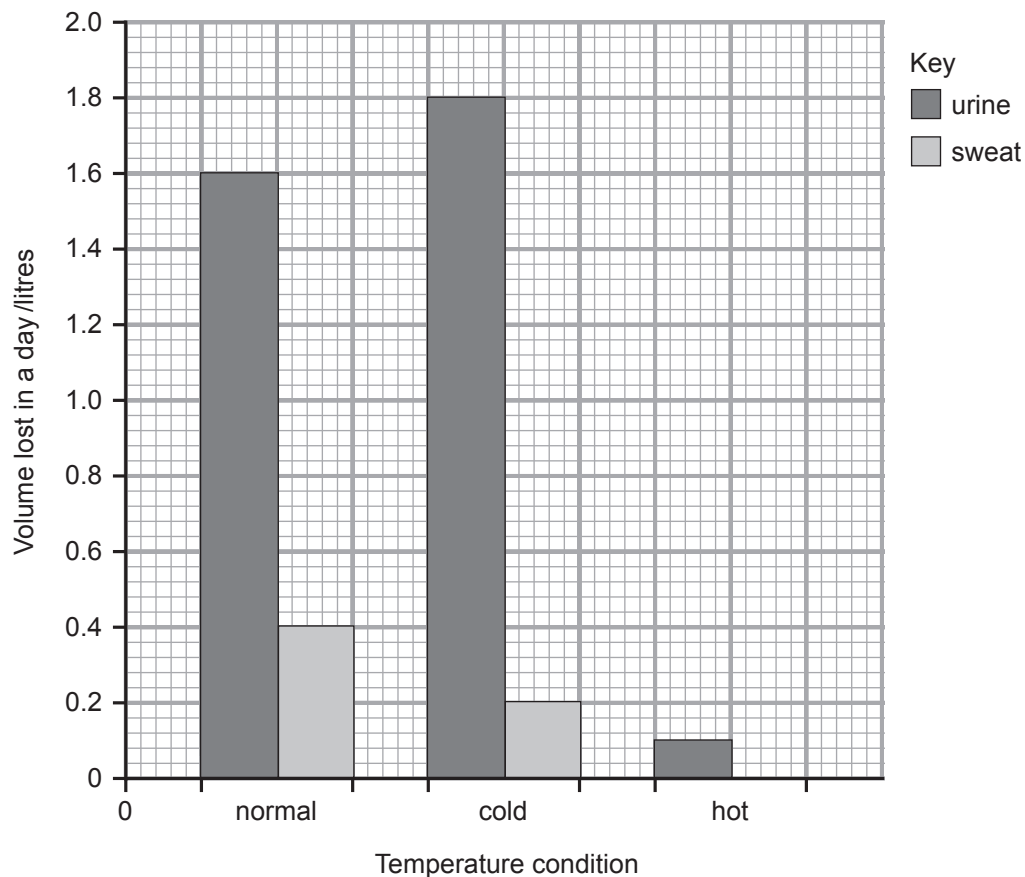
[1]



A study into water loss by a person was carried out at three different temperatures, over three days.

- Each day the temperature was different.
- This person had consumed the same food and drink each day.
- The **total** volume of water lost in urine and sweat by this person was the same each day.

The bar chart shows some of the results of this study.



(ii) Calculate the volume of sweat lost by this person in hot conditions.

Show your working.

_____ litres [3]
[Turn over]



(iii) In what temperature condition is most urine lost?

[1]

(iv) Use the graph to explain why most urine is lost in this temperature condition.

[1]

(c) When blood is filtered, waste products and useful substances move from the blood into the kidneys.

The waste products (such as urea) are passed into the urine.

The useful substances (such as amino acids, salts and glucose) are reabsorbed back into the blood.

(i) Name the **two** main substances found in urine.

_____ and _____

[2]

In a person with untreated diabetes one substance not usually found in urine, may be present in the urine.

(ii) Name this substance.

[1]

(iii) Suggest a reason for the presence of this substance in the urine of a person with untreated diabetes.

[1]





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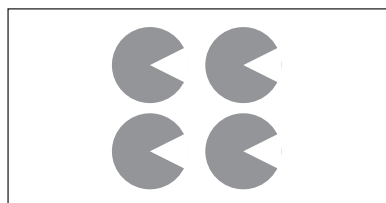
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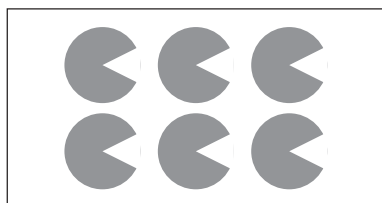


20GDW1117

8 The diagrams represent three enzyme solutions, **A**, **B** and **C**.



solution **A**

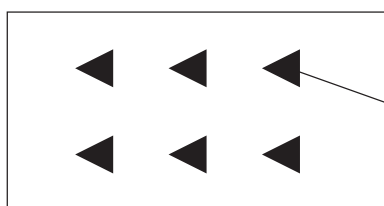


solution **B**



solution **C**

The diagram below shows the number of substrate molecules that may react with the enzymes in each of the three solutions.



one substrate molecule

(a) Describe and explain the rate of reaction in each solution.

In this question you will be assessed on your written communication skills including the use of specialist scientific terminology.

solution **A**



solution B

solution C

[6]

(b) Describe and explain the effect of **lowering** the temperature on the rate of an enzyme-controlled reaction.

[3]



Sources:

Question 1: © Getty Images

Question 2(b): Principal Examiner

Question 2(c): Principal Examiner

Question 5: Chief Examiner

Question 5 (graph): Chief Examiner & Principal Examiner

Question 6(a): Chief Examiner

Question 7(b): Chief Examiner

Question 8: Chief Examiner

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Examiner Number

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