



Rewarding Learning

General Certificate of Secondary Education
2021–2022

Centre Number

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Candidate Number

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Double Award Science: Biology

Unit B1

Foundation Tier



[GDW11]

GDW11

WEDNESDAY 23 FEBRUARY 2022, 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 **7(a)**.



- 1 (a) Enzymes are biological catalysts.
Circle the correct answer to complete the sentences below about enzymes.

(i) Enzymes are made up of

protein
carbohydrate
fat

[1]

(ii) Enzymes

speed up
slow down
do not affect

the rate of a reaction.

[1]

(iii) Enzymes are

used up
not used up
produced

in a reaction.

[1]

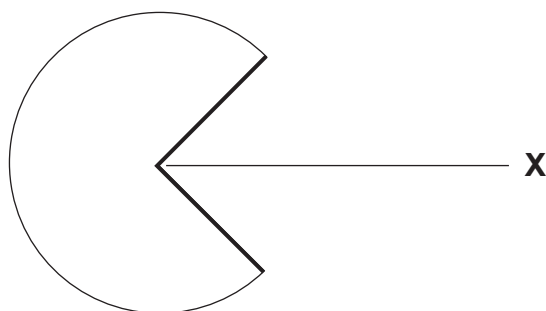
(iv) Enzymes are denatured at a temperature of

0 °C
20 °C
60 °C

[1]



- (b) The diagram below shows an enzyme molecule.
Name the part of the enzyme molecule labelled X.



X _____ [1]

- (c) Give **two** factors **other** than temperature that affect the rate of enzyme action.

1. _____

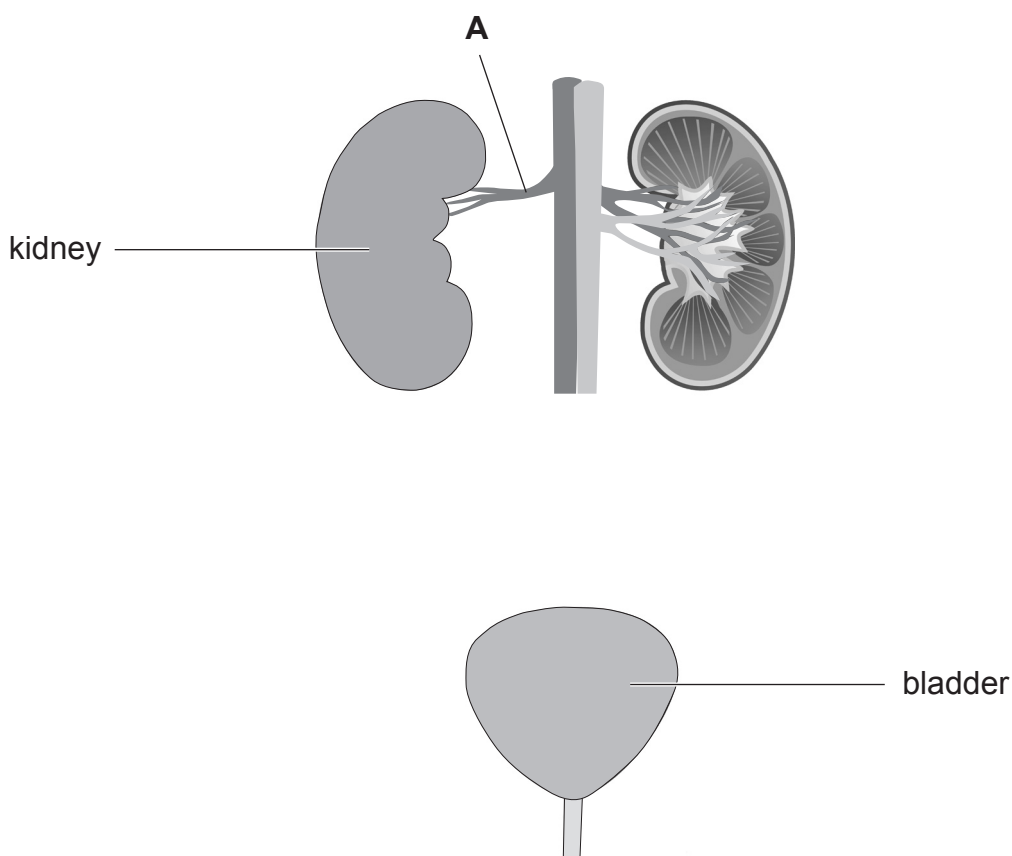
2. _____

[2]

[Turn over



2 The diagram below shows some parts of the excretory system.



(a) Name blood vessel **A** that transports blood **into** the kidney.

[1]

(b) On the diagram above, draw the tube that links the **labelled kidney** to the bladder.

[2]

(c) Circle the names of **two** parts of the **kidney** in the list below.

cortex	ureter	pelvis
medulla	urethra	

[2]





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(Questions continue overleaf)



3 (a) Plants carry out photosynthesis in their leaves.

(i) Name the structure in a plant leaf **cell** where photosynthesis takes place.

[1]

(ii) Why is sunlight needed for photosynthesis?

[1]

(iii) Name the substance absorbed from the soil that is needed for photosynthesis.

[1]

(iv) Name the gas produced during photosynthesis.

[1]

(v) Glucose is produced during photosynthesis.
How is glucose stored in a plant leaf cell?

[1]



Leaves are adapted to carry out photosynthesis.
Some parts of a leaf and their adaptations are given below.

(b) Use a ruler to draw a line to link each part of the leaf to its adaptation.

Part of the leaf

Adaptation

Palisade mesophyll

Transparent layer to allow
light through.

Stomata

Allow diffusion of gases inside
the leaf.

Waxy cuticle

Layer of tightly packed cells that carry
out **maximum** photosynthesis.

Intercellular air spaces

Layer with cells that carry out some
photosynthesis.

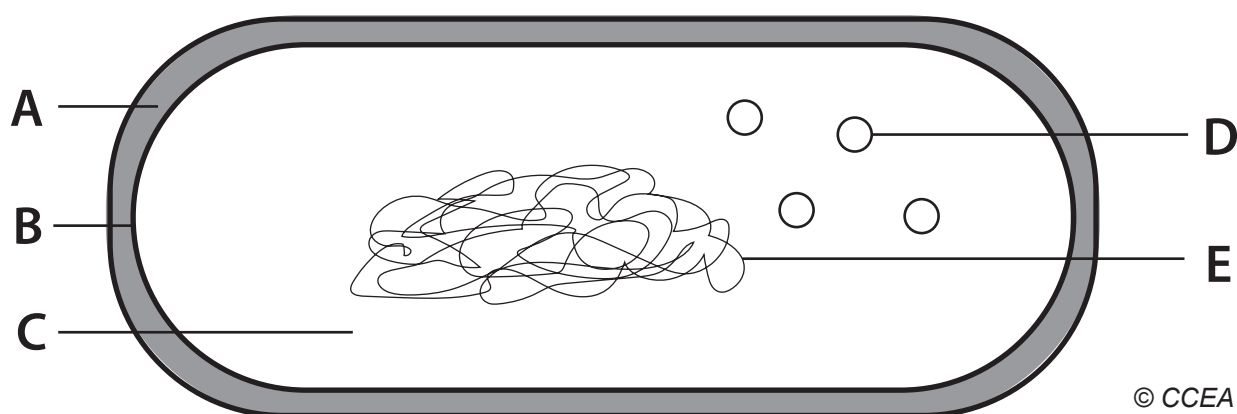
Pores that allow gases to enter
and leave the leaf.

[3]

[Turn over



4 The diagram below shows a bacterial cell.



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(a) Give the **letter** from the diagram that labels each of the following structures:

cell wall _____

plasmid _____

cytoplasm _____

[3]

(b) Give **two** letters from the diagram that label structures found in **both** bacterial cells and plant cells.

1. _____

2. _____

[2]





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- 5 (a) Students carried out an investigation into the growth of plant seedlings (young plants). They placed a different number of seedlings into four identical pots.

The table below shows the number of seedlings in each pot.

Pot	Number of seedlings
A	25
B	50
C	75
D	100

The students grew the seedlings for ten days.

- (i) The total mass of the seedlings in pot **D** was 1600 mg.
Calculate the **average mass of each** seedling in pot **D**.

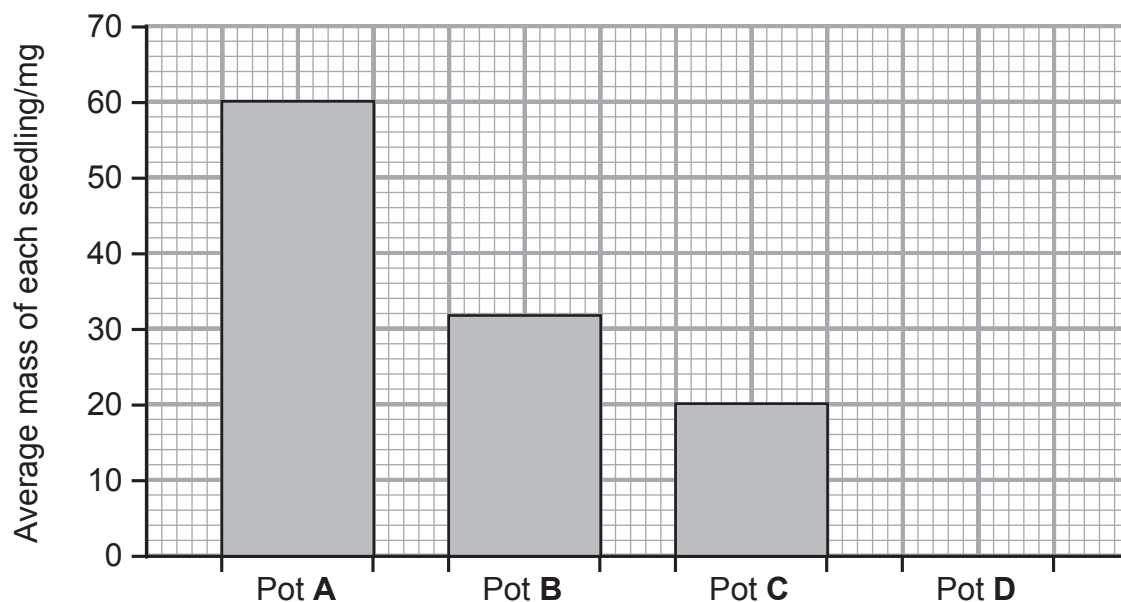
Show your working.

_____ mg [2]



The students then recorded the **average mass of each seedling** in each of the other three pots.

The results for pots **A**, **B** and **C** are shown in the bar chart below.



- (ii) Use your answer in part (i) to add the bar for pot **D** to the bar chart. Shade the bar that you have drawn.

[1]

- (b) (i) Give the **overall trend** shown in the bar chart for pots **A** to **C**. Use the data for pots **A** and **C** **only** to support your answer.

[2]

[Turn over



(ii) Suggest an explanation for the trend for pots **A** to **C**.

[2]





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- 6 Scientists have been monitoring a population of killer whales in the Pacific Ocean. This population of killer whales feeds mainly on Chinook salmon.

The photographs below show one of these killer whales and some Chinook salmon.



killer whale



Chinook salmon

The statements below give information about the food web that includes these killer whales and Chinook salmon.

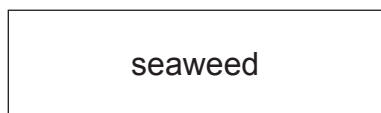
Seaweed and plankton carry out photosynthesis.
Insects feed on seaweed.
Crustaceans feed on plankton.
Salmon feed on insects and crustaceans.
Seals feed on salmon and crustaceans.
Killer whales feed on salmon.



(a) Use the statements opposite to complete the food web below.



seaweed



[4]



Chinook salmon are born in a river and then swim to the Pacific Ocean.
These salmon return to this river to reproduce.
The salmon need cold river water to survive and reproduce.
Due to climate change, the water in this river has become warmer.

- (b) Suggest what effect warmer river water could have on the **killer whale** population.
Explain your answer.

[3]

- (c) In 2016, scientists monitoring this killer whale population found 78 individuals.
This was 80% of the population of these whales recorded in 1990.

- (i) Calculate the size of the population of these killer whales in 1990.
Give your answer to the **nearest whole number**.

Show your working.

_____ [3]

- (ii) Suggest **one** measure that scientists could take to increase the population size of these killer whales.

[1]





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(b) Name the other type of communication system in the body and state **one** way it differs from the nervous system.

_____ system.

Difference _____

_____ [2]



- 8 (a) When leaves fall to the ground, in autumn, they are broken down by decomposers.
Decomposers produce enzymes to break down the different substances in the leaves.

(i) Name **two** types of decomposer.

1. _____

2. _____

[2]

Table 1 below gives information about three different decomposers **A**, **B** and **C**, and the enzymes they produce.

Table 1

Decomposer	Enzyme produced	Substance in leaves broken down by enzyme
A	lignase	lignin, a woody substance in cell walls
B	amylase	substance X
C	cellulase	substance Y

Substance **X** is broken down by the enzyme amylase.

(ii) Name substance **X**.

[1]

Substance **Y** is found in **cell walls**.

(iii) Name substance **Y**.

[1]



- (b) The percentage (%) of substances in the leaves **broken down** by decomposers in autumn over 15 weeks was recorded.

Table 2 below shows the results.

Table 2

Time/weeks	Percentage (%) of substance broken down		
	Lignin	Substance X	Substance Y
0	0	0	0
5	0	30	0
10	0	60	20
15	10	90	30

- (i) Use the information in **Table 2** above to name the substance that takes the **longest** time to break down.

[1]

- (ii) Use the information in **Table 1** opposite **and Table 2** above to calculate the **rate** of breakdown caused by decomposer **C** over 15 weeks.

Show your working.

_____ % per week [2]

[Turn over]



- (c) Suggest how the rate of breakdown by decomposers in winter would compare to the rate of breakdown by decomposers in autumn.

Explain your answer.

Rate of breakdown in winter _____

Explanation _____

_____ [2]

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Sources:

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Question 4: Source: GCSE Biology for CCEA J.Napier & D.Boyd ISBN 9781471892158

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Question Number	Marks
1	
2	
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4	
5	
6	
7	
8	

Total Marks	
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Examiner Number

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