



Rewarding Learning

General Certificate of Secondary Education
2022

Centre Number

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Candidate Number

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Double Award Science: Biology

Unit 7 Practical Skills
Booklet B
Higher Tier



[GDW76]

GDW76

WEDNESDAY 15 JUNE, MORNING

TIME

30 minutes.

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** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 35.

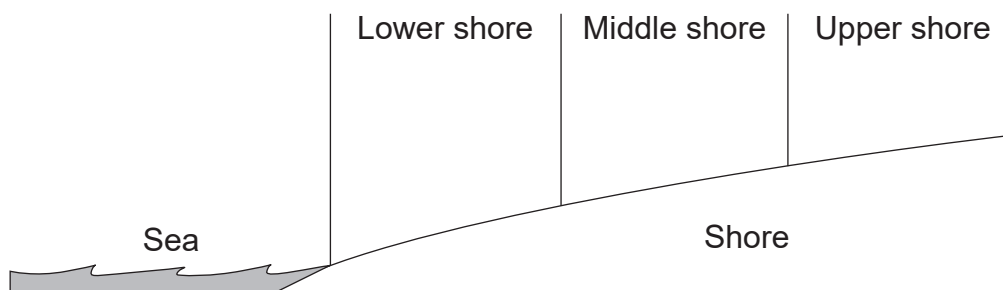
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **2**.



- 1 (a) A group of students investigated the distribution of four types of seaweed at different distances from the sea on a shore.

The diagram below shows the areas of the shore where the four types of seaweed were found.



- (i) Name the apparatus the students used to sample the seaweed.

[1]

- (ii) Name the sampling method the students used.

[1]

The students used an anemometer to measure an abiotic factor on this shore.

- (iii) Name this abiotic factor.

[1]

- (iv) How could the students improve the reliability of their results?

[1]





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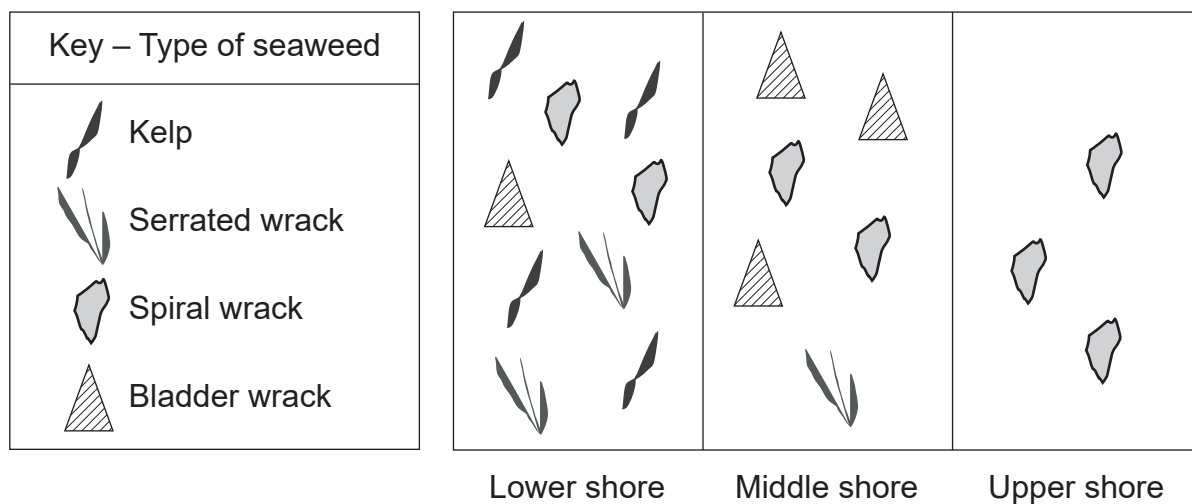
(Questions continue overleaf)



(b) The students used a key to identify the four types of seaweed sampled.

One of the students drew a diagram to show the presence of the different types of seaweed on the lower, middle and upper shores.

The diagram below shows the student's results.



Source: Principal Examiner

(i) Use **only** the diagram to give a conclusion about the distribution and number of **spiral wrack** on the shore.

Distribution _____

Number _____ [2]



- (ii) Describe the trend in the number of types of seaweed found between the lower shore and the upper shore.

Give **one** piece of data to support your answer.

[2]

- (iii) The list below gives the three areas of the shore.

Draw a circle around the area which has the **greatest** biodiversity.

lower shore	middle shore	upper shore
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[1]

Flat periwinkles are animals that feed on **bladder wrack** and **kelp**.

- (c) Predict the area of the shore, lower, middle or upper, where you would expect to find the **fewest** flat periwinkles.

Use the information in the diagram on page 4 opposite to explain your answer.

Area of shore _____

Explanation _____

[2]

[Turn over



- 2 The photograph below shows a geranium plant with variegated leaves.



Source: Principal Examiner

A student destarched the geranium plant and then placed it in bright light for 48 hours. He then carried out a starch test on **one variegated leaf** from the geranium plant.

Describe and explain **the results** the student obtained when he carried out the starch test on the **variegated leaf**.

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

Results for green area _____





- 3 (a) A scientist investigated the effect of **one type** of exercise on the breathing rate of two 35-year-old women, **A** and **B**.

He recorded their breathing rates at the start of the exercise, and then every minute during the exercise, for five minutes.

- (i) Give the dependent variable in this investigation.

[1]

- (ii) Give **one** variable the scientist controlled in this investigation.

[1]

- (b) The table below shows the results for woman **A** and woman **B**.

Exercise time /minutes	Breathing rate/breaths per minute	
	Woman A	Woman B
0	14	16
1	15	18
2	17	20
3	19	23
4	21	26
5	23	29

- (i) What piece of apparatus did the scientist use during the investigation to allow him to calculate the breathing **rate**?

[1]

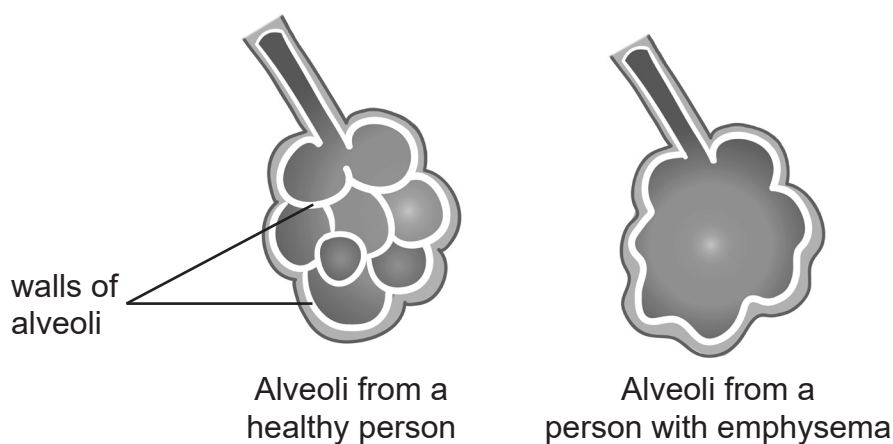


- (ii) Calculate the **difference** in the **increase** in breathing rate for woman **B** compared to woman **A** after five minutes.

Show your working.

_____ [2]

The diagrams below show alveoli from a healthy person and alveoli from a person with emphysema.



© Jeanette Engqvist / Science Photo Library (image modified)

Woman **B** has emphysema.

- (iii) Use the diagram to help describe how the alveoli differ in woman **B**.

Explain why this leads to a higher breathing rate in woman **B**.

_____ [3]

[Turn over]



- 4 (a) A student investigated the speed of nerve impulses using a computer program.

She looked at the computer screen and clicked the mouse every time an object appeared on the screen.

- (i) Name the receptor in this investigation.

[1]

The average time taken for the student to click the mouse was 0.02 seconds.

The length of the neurones involved in this reaction was **1 metre**.

- (ii) Calculate the speed of the nerve impulse along these neurones.

Use the equation:

$$\text{speed of the nerve impulse} = \frac{\text{distance}}{\text{time}}$$

Show your working.

_____ m/s [2]



A scientist carried out a different investigation.

The scientist calculated the speed of the nerve impulse when a person pulled their hand away from a very hot object.

The speed of this nerve impulse was 120 m/s.

- (b) The speed of this nerve impulse was faster than the speed of the nerve impulse calculated in part (a)(ii) opposite.

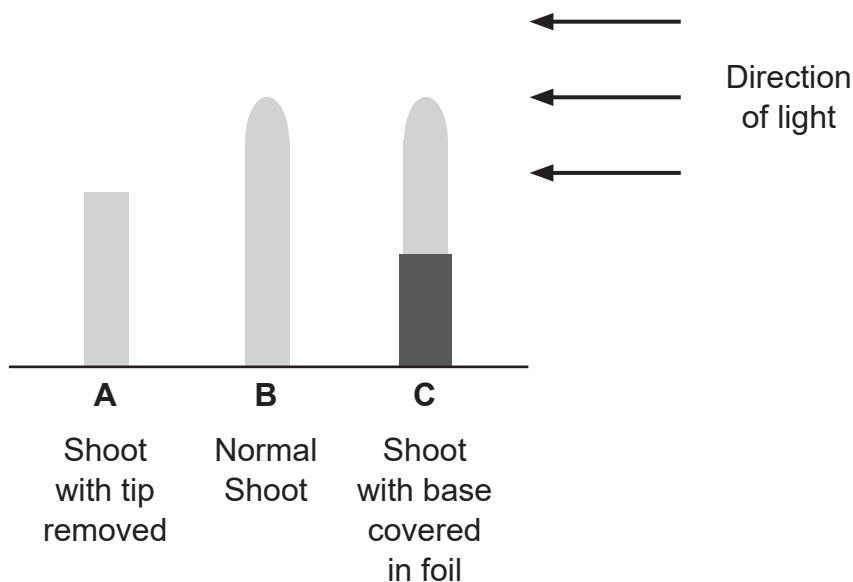
Explain why.

[2]



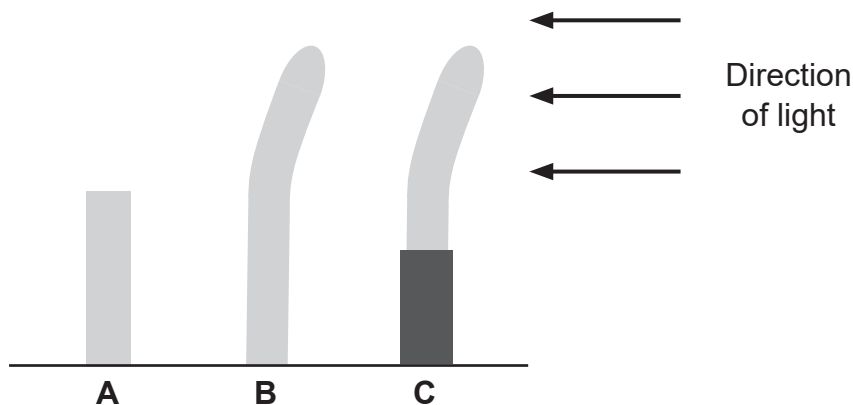
- 5 A student carried out an investigation into the growth response of plant shoots to light.

The diagram below shows how the student set up the investigation with three plant shoots.



The student left the shoots in the light for 1 week.

The diagram below shows the results.



The table below gives eight numbered statements.

Number	Statement
1	Base covering has no effect
2	Base covering has an effect
3	No auxin produced
4	More cell elongation on shaded side
5	More cell elongation on illuminated side
6	Shoot did not grow
7	More auxin on illuminated side
8	More auxin on shaded side

Give the numbers of the statements which best explain the results of the student's investigation for shoots **A** and **C**.

Write the numbers on the lines below.

(a) Shoot **A**.

_____ and _____

[2]

(b) Shoot **C**.

_____ and _____ and _____

[3]



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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	

Total Marks	
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Examiner Number

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