



Additional Assessment Materials
Summer 2021

Pearson Edexcel GCE (Biology A)

Resource Set Topic 4: Biodiversity and Natural
Resources

Question Paper

(Public release version)

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General guidance to Additional Assessment Materials for use in 2021

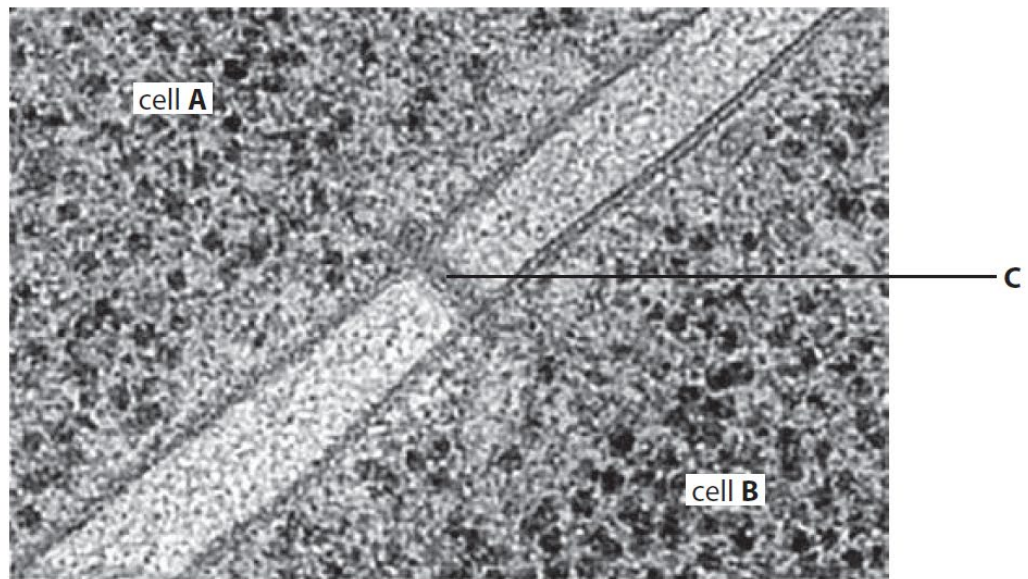
Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an **optional** part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

3 The electronmicrograph shows the junction between two plant cells, **A** and **B**.



(a) (i) Name the structure labelled **C**.

(1)

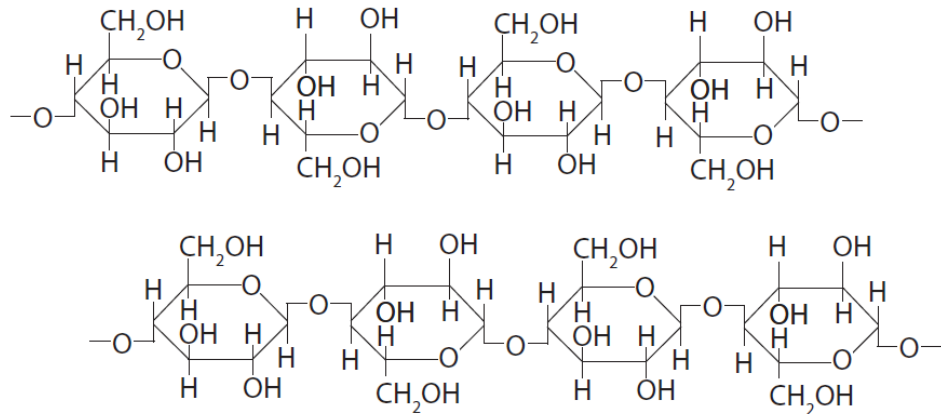
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(ii) Explain the function of the structure labelled **C**.

(2)

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- (b) The cell wall consists of cellulose molecules arranged as microfibrils.
The diagram shows the partial structure of two molecules of cellulose.



- (i) Draw **one** link on the diagram that would hold these molecules together in a microfibril.

(1)

- (ii) Compare and contrast the structure of cellulose and amylopectin.

(3)

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- (c) Plant cells also contain structures called amyloplasts.

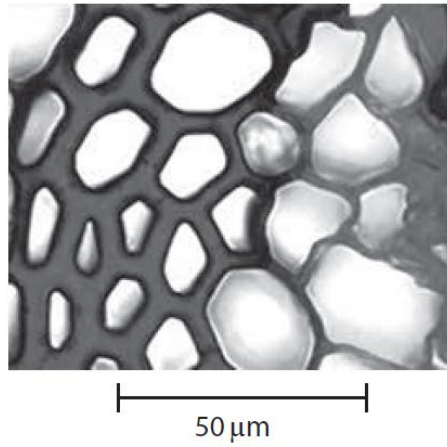
Amyloplasts

(1)

- A** allow fluid exchange
- B** consist mainly of pectin
- C** are membranes surrounding the vacuole
- D** store starch granules

(Total for Question 3 = 8 marks)

- 4 The image shows a cross section of part of a plant stem examined using a light microscope.



- (a) (i) Label a sclerenchyma fibre with the letter **S**. (1)
- (ii) Calculate the magnification of this image. (3)

Answer.....

(b) (i) A nucleus will be found in a (1)

- A** companion cell
- B** sclerenchyma fibre
- C** sieve tube
- D** xylem vessel

(ii) Xylem and sclerenchyma fibres both (1)

- A** provide support
- B** transport glucose
- C** transport hormones
- D** transport mineral ions

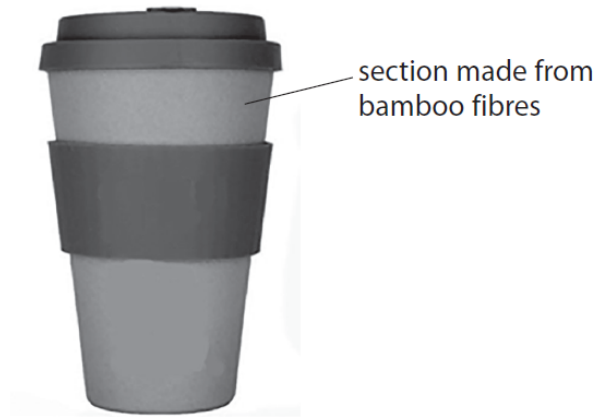
(iii) The cell wall forms a greater percentage of the total mass of the sclerenchyma fibre than of a phloem sieve tube.

Which of the following explains this difference?

- (1)
- A** phloem sieve tubes do not contain organelles
 - B** phloem sieve tubes have thinner, lignified walls
 - C** sclerenchyma fibres contain organelles
 - D** sclerenchyma fibres have thickened, lignified cell walls

(Total for Question 4 = 7 marks)

(b) The photograph shows a coffee cup made from bamboo fibres.



Explain why the use of bamboo fibres to make coffee cups is sustainable.

(2)

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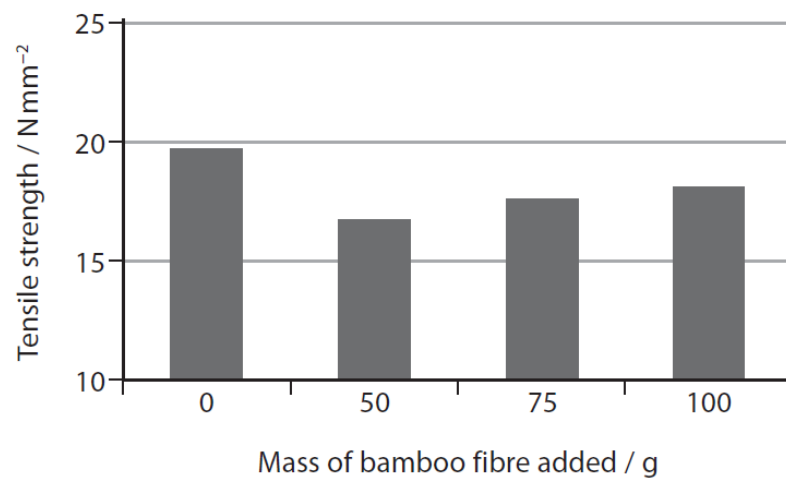
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(c) The effect of mixing bamboo fibre with resin was investigated.

The tensile strength of fibres made from a mixture of resin and different masses of bamboo fibre was measured.

The results are shown in the graph.



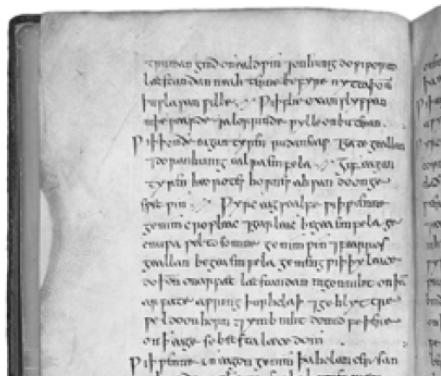
Describe how the tensile strength of these fibres could have been measured.

(3)

(Total for Question 5 = 9 marks)

- 4 Bald's Leechbook was written in the 9th Century. This book contains details of medical treatments used over 1000 years ago.

The recipe for a 'salve', used to treat infections, is shown in the photograph.



Scientists followed the recipe to make this salve and tested it in the laboratory.

They found that the salve was very effective against *Staphylococcus aureus*. This bacterium commonly causes infections in humans.

- (a) Describe **two** aseptic techniques that should be used when working safely with bacteria.

(2)

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(b) The salve was also tested on mice.

These mice had skin wounds infected with *S. aureus*. The salve was very effective in treating these infections.

(i) Explain why some bacteria can grow rapidly in skin wounds.

(3)

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(ii) *S. aureus* can cause infections which are difficult to treat in humans.

Describe how scientists, after testing the salve on mice, could test whether the salve is an appropriate treatment for humans with wounds infected with *S. aureus*.

(4)

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(Total for Question 4 = 9 marks)

4 A number of seed banks have been set up around the world.

(a) When a seed bank receives new seeds, it processes them in several ways. The processes can include the following stages:

- washing the seeds with disinfectant
- allowing the seeds to dry.

Explain the advantages of these two stages.

(3)

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(b) The food store of many seeds is an organ called a cotyledon.

An organ can be defined as

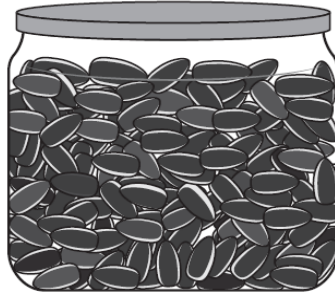
(1)

- A a group of cells of one type that has a function
- B a group of several different cell types, each type working together
- C a group of tissues that are located together that have unrelated functions
- D part of a system and therefore does not have a function of its own

- (c) The processed seeds are stored at minus 20°C. At intervals, samples of seeds are removed from storage and tested for viability.

If at least 75% of the seeds in the sample germinate, the remaining seeds are described as viable.

The diagram shows a container with many seeds in it.



Sunflower Seeds
mass of 1000 seeds = 50 g

A sample of 3 g of seeds was removed from this container. These seeds were given optimum conditions for germination.

However, only 48 seeds germinated.

Determine whether the remaining seeds in the container are viable or not.

(3)

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(Total for Question 4 = 7 marks)

4 Seed banks are used to conserve plant species for future generations.

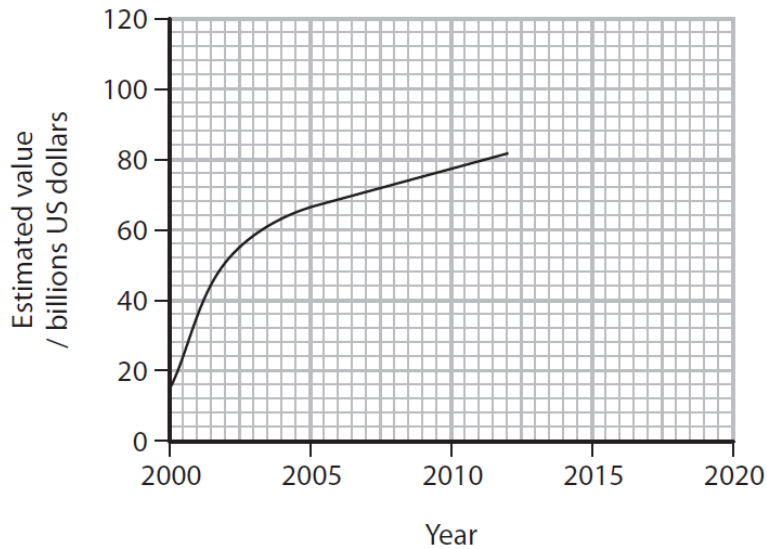
A study has shown that 28 187 species of plant have medical uses. Of these species only 4478 have been cited in medical journals.

(a) What percentage of the species with medical uses has been cited in medical journals, and is shown to three significant figures?

(1)

- A 15.9%
- B 16.0%
- C 0.159%
- D 0.160%

(b) The global value of plant species used in herbal medicine has increased as shown in the graph.



Predict the value of global trade in herbal medicines by 2020.

(1)

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(d) Scientists measure biodiversity using both species richness and the heterozygosity index.

State what is meant by the following terms:

(2)

species richness

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heterozygosity index

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(Total for Question 4 = 9 marks)

TOTAL FOR TEST = 49 MARKS