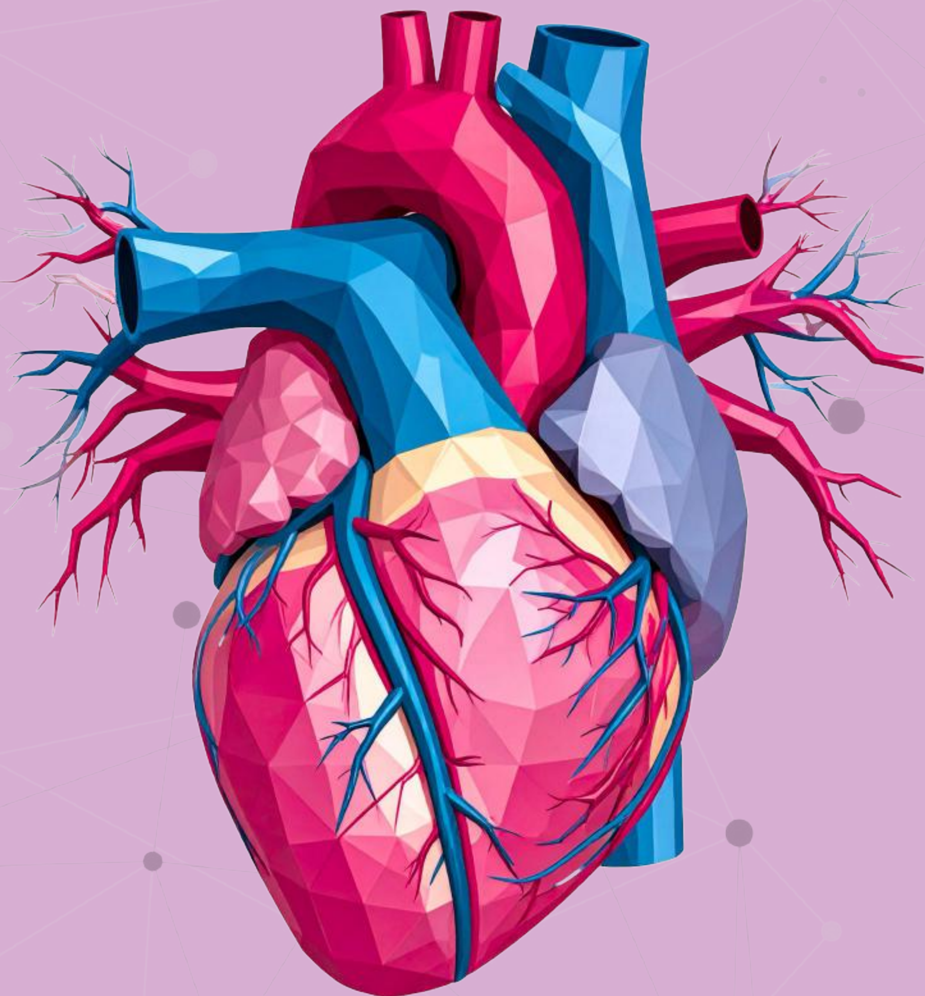
edexcel

AS Biology



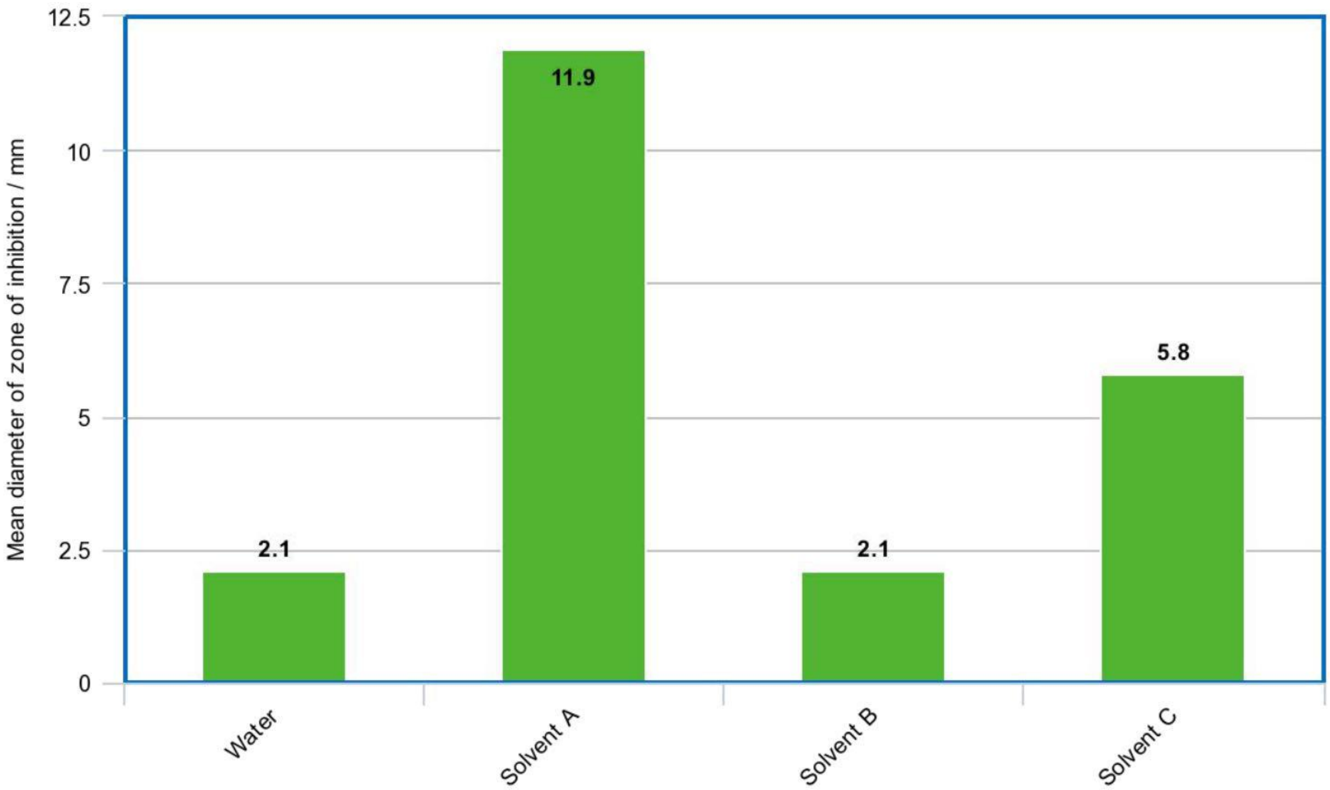
LATEST SYLLABUS

Unit 3
2019 – 2025
Classified Questions

SCAN ME

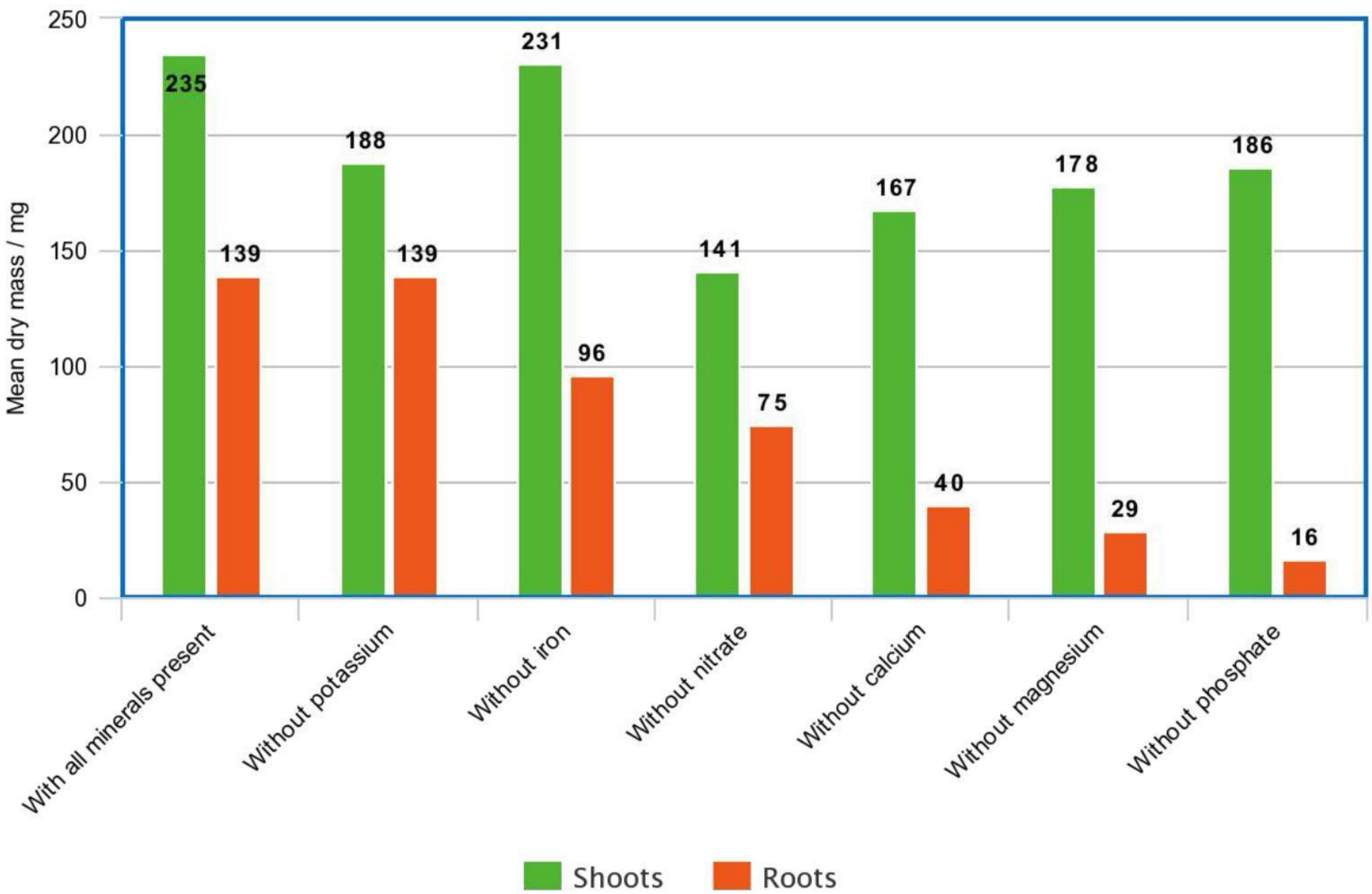
(i) Plot the information about the solvent used to prepare the extract and the mean diameter of the zone of inhibition in a suitable graphical form.

(4)



(a) (i) Plot the data from the table, in a suitable graphical form, to compare the mean dry masses of shoots and roots in each of the solutions.

(4)

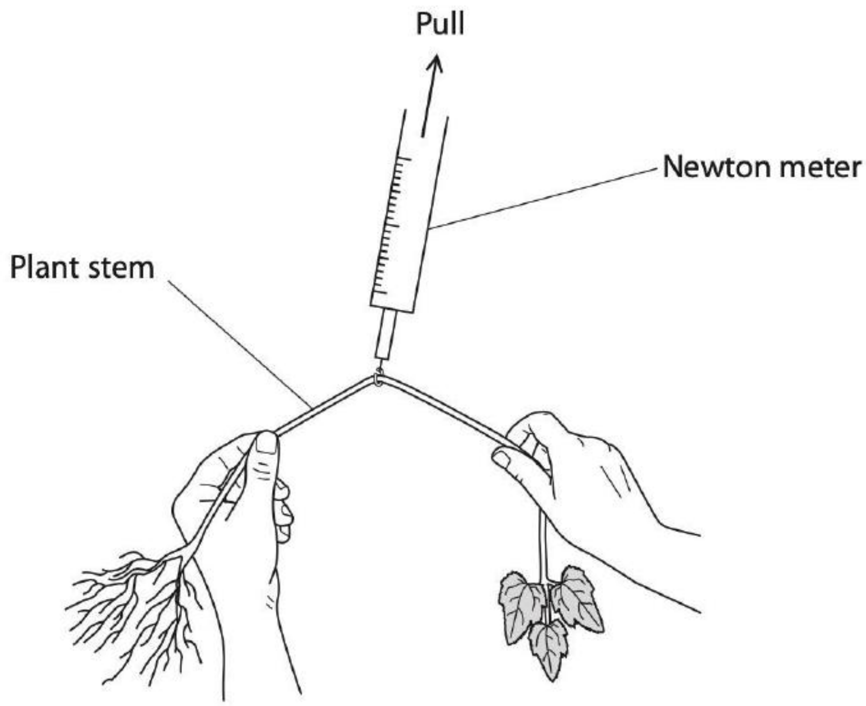


4 Plants living in rivers and lakes experience pulling forces from water currents and waves. These forces may damage or destroy the plants and it is important to know what forces they can withstand.

Scientists investigated the force needed to break a plant stem. This force is called the breaking strength.

In one series of experiments, they investigated the relationship between the cross-sectional area of stems and the forces needed to break them.

These forces were measured with a newton meter, as shown in the diagram below. The meter was pulled until each stem broke and the forces were recorded.



(a) (i) Name the dependent variable in this experiment.

(1)

breaking strength

(ii) Assuming that the stem is circular, suggest how stem cross-sectional area could be determined accurately.

(2)

1. measure diameter with a micrometer
2. calculate the surface area: πr2

(iii) Give **two** variables to be controlled in this investigation. Describe how they could be controlled.

(4)

Variable 1 length of fibre Humidity Temperature

How it could be controlled using an accurate ruler

a closed chamber with a baker containing 25 cm3 of water

thermostatically controlled chamber

Variable 2 Cross-sectional area soaking time same species / age

How it could be controlled using a micrometer

use a stopclock to ensure that fibres are soaked fro the same time

obtain all fibres from the same plant

(b) (i) The results of an investigation using sisal fibres are shown in the table below (1 MPa = 1 million pascals).

Sodium hydroxide concentration (%)	**Mean tensile strength / MPa**
0.00	395
0.04	425
0.08	540
0.16	820
0.24	590
0.32	620

Fig. 1.2 is a photomicrograph showing part of an organ from a plant of a different species.

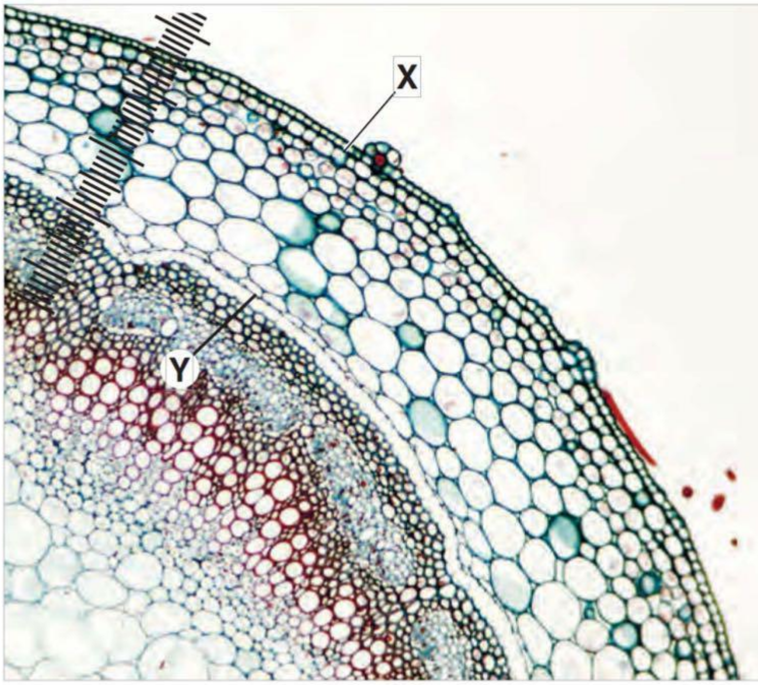


Fig. 1.2

(ii) Fig. 1.2 shows a photomicrograph taken using the same microscope with the same lenses as Fig. 1.2.

Use the calibration of the eyepiece graticule unit from **(b)(i)** and Fig. 1.2 to calculate the actual length of the plant tissue from **X** to **Y.**

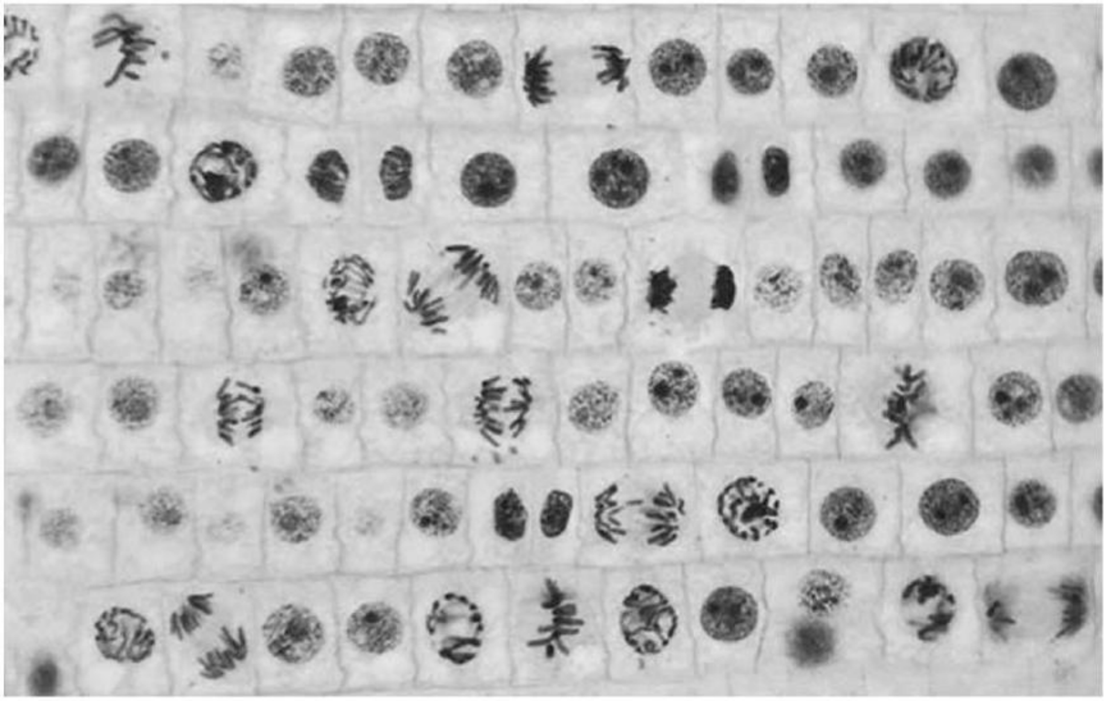
22 / 23 / 24 unit

24 x 12.5

300 µm

(2)

10 The photomicrograph below shows a stained squash preparation of an onion root tip.



(a) Describe how you would prepare a root tip squash to observe the stages of mitosis under the light microscope.

(4)

Treat roots with HCl to break cell wall

Remove 2mm of the tip and place on a slide

Add acetic orcein and heat gently

Then add cover slip and press firmly and vertically

(ii) Use the information in the table to calculate the mean rate of decrease of vitamin C per day during storage.

Show your working.

(3)

Mean decrease: 14.3 - 7.7 = 6.6

Number of days: 7 x 8 = 56

6.6 / 56

Answer 0.12 / 0.118 / 0.1179 mg per 100 g per day

(iii) The fresh pineapple contained 24.8 mg of vitamin C per 100 g.

Use the information in the table to calculate the percentage decrease of vitamin C when jam is made.

Show your working.

(3)

24.8 - 14.3 = 10.5

10.5 / 24.8 x 100 = 42.3

Answer 42.3 / 42 %

(ii) Suggest how the **dependent** variable could have been measured.

(3)

samples of the liquid around the discs were removed

Intensity of colour is measured

using a colorimeter by measuring absorbance / transmission

(iii) The temperature was kept constant throughout this investigation. Suggest a suitable value for this temperature. Give a reason for your answer.

(2)

25 oC

Temperature does affect permeability of biological membranes

(iv) Suggest a suitable control for this investigation.

(2)

Discs put in water (without fenitrothion)

while keeping all other conditions identical

(b) The table below shows the colour of the solution every hour.

Time / hours	Colour of the solution / arbitrary units
0.0	0.00
1.0	0.00
2.0	0.00
3.0	0.03
4.0	0.05
5.0	0.10
6.0	0.12